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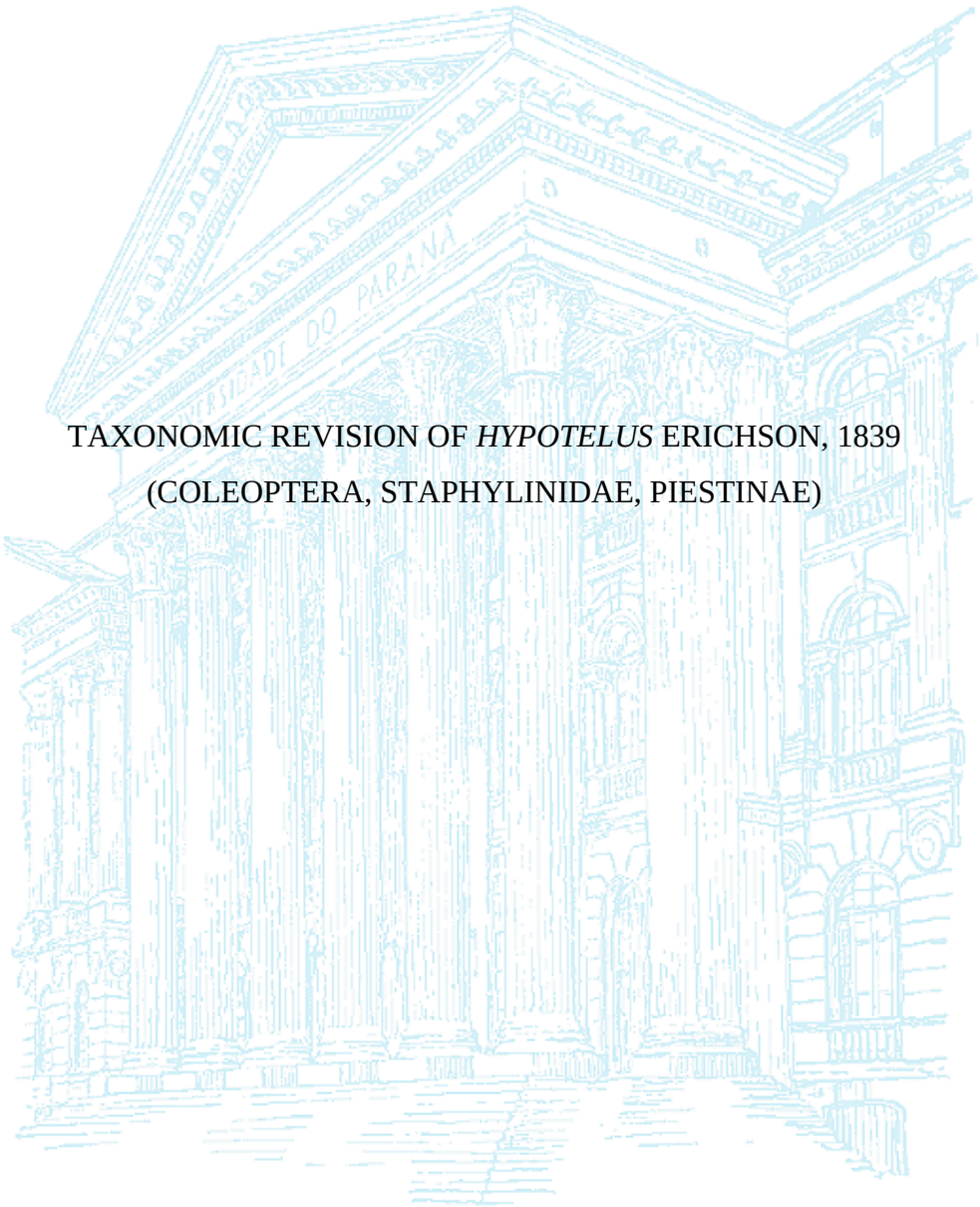

TAXONOMIC REVISION OF *HYPOTELUS* ERICHSON, 1839 (COLEOPTERA, STAPHYLINIDAE, PIESTINAE)

CURITIBA

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Dissertação apresentada como requisito parcial à obtenção do grau de Mestre em Ciências Biológicas, no Programa de Pós-Graduação em Ciências Biológicas, Área de Concentração em Entomologia, da Universidade Federal do Paraná.

Orientador: Prof. Dr. Edilson Caron
Co-orientadora: Profa. Dra. Cibele S. Ribeiro-Costa

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Prof. Dr. Edilson Caron (Orientador)
(UFPR)

Prof. Dr. José Ricardo Miras Mermudes
(UFRJ)

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Curitiba, 19 de fevereiro de 2016.

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RESUMO

Hypotelus Erichson, 1839, gênero de estafilinídeos predominantemente neotropicais, são comumente coletados embaixo de cascas de árvores em diversos estágios de decomposição ou sob serapiheira em florestas, nos quais alimentam-se da matéria orgânica vegetal em decomposição ou dos fungos que ali se desenvolvem. *Hypotelus* é um dos sete gêneros atuais da subfamília Piestinae no qual apresenta monofilia incerta, e que, historicamente foi definida por plesiomorfias, como ausência de glândulas defensivas e presença de paratergitos. Piestinae está alocada no grupo Oxyteline, juntamente com Scaphidiinae, Oxytelinae e Osoriinae, sendo que atualmente *Hypotelus* é grupo-irmão de Osoriinae. O objetivo do presente estudo foi fornecer uma completa revisão taxonômica de *Hypotelus* e assim, contribuir para o entendimento da incógnita de "Piestinae". Como resultado, *Hypotelus* contém onze espécies, incluindo três novas. Para o gênero e cada espécie, foram elaborados lista catalográfica, dados diagnósticos, descrição ou redescrição, registros geográficos, relatos da biologia e ilustrações diagnósticas. Assim, o gênero possui as seguintes características diagnósticas: corpo suavemente cilíndrico, antenômeros 5-11 com microcerdas e algumas longas cerdas dispersas, margem anterior do mento notavelmente emarginada, élitros com uma estria longitudinal próxima a sutura elitral, segmentos abdominais 3-6 com dois pares de parategitos e o segmento abdominal 7 visivelmente maior que os demais. Com relação as mudanças nomenclaturais, os nomes *H. hostilis* Fauvel, 1864 e *H. lucidus* Sharp, 1887 são indicados como sinônimos junior de *H. pusillus* Erichson, 1840. Para finalizar, uma chave dicotômica para *Hypotelus* é disponibilizada e novos dados de distribuição, tanto para o gênero quanto para algumas espécies, foram listados.

Palavras-chave: Estafilinídeo subcortical, grupo Oxyteline, morfologia, Neotropical, taxonomia

ABSTRACT

Neotropical Rove beetles of the genus *Hypotelus* Erichson, 1839 are commonly found under tree bark of several decaying stages or in leaf litter on forests, where they feed on the decaying organic matter or on fungi found in these habitats. *Hypotelus* is one of the current seven genus of Piestinae, which is a subfamily with monophyly uncertain and was historically defined by plesiomorphies, such as lacking defensive glands and having paratergites. Piestinae is allocated in Oxyteline group, along with subfamilies Scaphidiinae, Oxytelinae and Osoriinae, and currently *Hypotelus* is sister-group of Osoriinae. The main aim of the present study was to provide a complete taxonomic revision of *Hypotelus* and, therefore, to contribute for the understanding of the poorly known "Piestinae". As a result, *Hypotelus* is comprised by eleven species, three of them being new. For the genus and each species, it was provided a catalog list, diagnostic data, description and redescription, geographic records, biology notes and diagnostic illustrations. *Hypotelus* has the following diagnostic characters: body slightly cylindrical; antennomeres 5-11 entirely with microsetae and some long dispersed setae; mentum with anterior angles conspicuously emarginated; elytra with one longitudinal striae closely on elytral suture; abdominal segments 3-6 with two pairs of paratergites and abdominal segment 7 visibly the longest one. Regarding the nomenclatural changes, the names *H. hostilis* Fauvel, 1864 and *H. lucidus* Sharp, 1887 were indicated as junior synonyms of *H. pusillus* Erichson, 1840. An identification key for *Hypotelus* was provided and new distributional data for the genus as well as for some species are listed.

Key words: Morphology, Neotropical, Oxyteline group, subcortical rove beetle, taxonomy

SUMMARY

INTRODUCTION

The beetle family Staphylinidae is the most diverse family of animal Kingdom, with almost 58.000 described species (Grebennikov and Newton 2012). For example, in Brazil, are known 2.812 species described in 471 genera and allocated in 16 subfamilies (Newton and Caron 2016). Commonly known as rove beetles, they are easy to be recognized because of the short and truncated elytra, which expose almost all abdominal tergites. They are distributed in all continents except Antarctica, and have very varied feeding behavior, with predatories, saprophagous, micophagous or ectoparasitic species.

Piestinae Erichson, 1839 is one of the oldest of the 32 currently recognized extant staphylinid subfamilies, but historically has been poorly defined and used as a repository for a diverse assortment of rove beetles that do not fit well elsewhere (Caron *et al*. 2012). It was historically defined by plesiomorphies, such as lacking defensive glands (unlike Oxytelinae), and having paratergites (unlike Osoriinae), as well as adults and larvae being flat and subcortical (Grebennikov and Newton 2012).

Piestinae are now allocated within the Oxyteline group *sensu* Grebennikov and Newton (2012), which is organized as follows: Scaphidiinae + ("Piestinae"+Osoriinae+Oxytelinae) and composes a subfamily of uncertain monophyly, as according Grebennikov and Newton (2012) Piestinae has been consistently suggested as paraphyletic in relation with Osoriinae and Oxytelinae.

However, Piestinae includes 106 species placed in eight genera: *Abolescus* Tikhomirova, 1968, one Jurassic fossil species found in Karatau, Kazakhstan; *Eupiestus* Kraatz, 1859, 21 species in the eastern Palearctic and Oriental regions; *Hypotelus* Erichson, 1839, ten species in the Nearctic and Neotropical regions; *Parasiagonum* Steel, 1950, one species from New Zealand; *Piestoneus* Sharp, 1889, five species in the eastern Palearctic region; *Piestus* Gravenhorst, 1806, 43 species in the Nearctic and Neotropical regions; *Prognathoides* Steel, 1950, one species from Australia; and *Siagonium* Kirby & Spence, 1815, 24 species in the Holarctic and Neotropical regions (Herman 2001; Zheng 2004; Naomi 2006; Khachikov 2007; Caron *et al.* 2012).

Hypotelus is a small genus of Piestinae with 10 described species: *H. hostilis* Fauvel, 1864 [=1865]; *H. insulanus* Bierig, 1934; *H. lucidus* Sharp, 1887; *H. marginatus* Sharp, 1887; *H. micans* Sharp, 1876; *H. praecox* Erichson, 1840; *H. pusillus* Erichson, 1840; *H. testaceus* Bierig, 1934; *H. andinus* (Bernhauer, 1917) and *H. laevis* (Solsky, 1872). The most species of

the genus are presumably saprophagous and are commonly found associated with decaying logs or in leaf litter in forests. A recent phylogenetic study, Grebennikov and Newton (2012) suggest *Hypotelus* as sister-group of all species of Osoriinae.

Thus, now, *Hypotelus* comprises ten species distributed almost exclusively in the Neotropical region (except *H. pusillus* in Florida, USA), but there is not a revision of its species, neither diagnostical characters for the genus, and a recent phylogenetic study suggests that *Hypotelus* would be a sister-group of Osoriinae.

The problematic taxonomic history of the Piestinae and the presence of only plesiomorphies may reflect taxonomic errors as well as misinterpretations about the evolution of this group. Following the suggestion of Grebennikov and Newton (2012), Piestinae should be re-evaluated and likely split into two or more monophyletic taxa of subfamily rank. Therefore, the morphological and taxonomic understanding of *Hypotelus*, as the other related genera, is a first step in solving the poorly known Piestinae.

REVIEW OF LITERATURE

Erichson (1839) described *Hypotelus* without included species, considering that in the following year Erichson (1840) described two species: *H. pusillus*, from Brazil and *H. praecox*, from Colombia; however, he did not designate the type species of the genus. The diagnostic characters, according to author (Erichson 1840), are short mandibles, hind maxillary palpus (or palpi) 2 times longer than precedent, spiny tibiae and abdominal tergites marginated (with paratergites).

Duponchel (1841) fixed *Hypotelus pusillus* as type species of the genus by subsequent designation.

LeConte (1863) described *H. picipennis* with distribution in Kansas and "middle states" of USA. However, Herman (1972) reviewed the genus *Charhyphus* Sharp, 1887 (Phloeocharinae) and transferred the specific name *picipennis* to *Charhyphus*.

Fauvel (1864) [=1865] described the species *H. hostilis* from Mexico and updated the distribution record of *H. pusillus* from Colombia.

Sharp (1876) described *H. micans* from a single individual found in Ega [=Tefé] (Brazil).

LeConte (1880) described *H. capito*, species with distribution in Nearctic region (Texas, USA). However, Newton (1988) transferred the specific name *capito* to the genus *Cephaloxynum* Bernhauer, 1907 (Aleocharinae).

Sharp (1887) described two species, *H. lucidus*, six specimens with distribution from Panama and *H. marginatus*, two specimens from Guatemala. Furthermore, Sharp (1887) updated the distribution knowledge of *H. hostilis* from Guatemala.

Leng (1920) recorded *H. hostilis* from Florida (USA), the unique species found until now in Nearctic region.

Bierig (1934), the last researcher to describe species in *Hypotelus*, being *H. testaceu*s with distribution from Panama and *H. insulanus* recorded from Cuba.

Caron *et al.* (2012) after phylogenetic study of *Piestus* transferred the valid species name *Piestus laevis* Solsky, 1872 and *Piestus andinus* Bernhauer, 1917 to *Hypotelus.*

Recently, Grebennikov and Newton (2012) using morphological data from adult and larva of basal groups of Staphylinidae, including the type species of *Hypotelus*, modified the knowledge of Oxyteline group, in particular the subfamily Piestinae and suggested that Piestinae are paraphyletic, forming at least two groups, one basal and other related to Osoriinae, with *Hypotelus* as a sister-group of Osoriinae, or even belonging to the Clade.

OBJECTIVES

General objective

Elaborate a complete taxonomic revision of *Hypotelus*, focusing on available morphological data to develop a future phylogenetic analysis studies.

Specific objectives

- diagnose and redescribe the genus *Hypotelus*;
- describe or redescribe its species;
- elaborate a key to species of *Hypotelus*;
- elaborate distributional maps for each species.

MATERIAL AND METHODS

Material examined

In the current study, about 300 adult specimens of *Hypotelus* were examined, loaned from four different museums (Tab. 1). The abbreviations cited below for each institution are used in all text citations. The name of the responsible curator is given in parentheses:

Table 1. Material examined.

Espécie	Autor	Material tipo	Material adicional
H. andinus	(Bernhauer, 1917)	1 FMNH	
H. hostilis	Fauvel, 1865	1 IRSNB	14 IRSNB + 9 FMNH
H. insulanus	Bierig, 1934	5 FMNH	
H. laevis	(Solky, 1872)	IRSNB	9 FMNH
H. lucidus	Sharp, 1887	BMNH + 1 FMNH	4 FMNH
H. marginatus	Sharp, 1887	BMNH	3 FMNH
H. micans	Sharp, 1876	BMNH	1 FMNH
H. praecox	Erichson, 1840	ZMHB	11 FMNH
H. pusillus	Erichson, 1840	3 ZMHB	1 ZMHB + 40 FMNH
H. testaceus	Bierig, 1934	4 FMNH	
Hypotelus spp.			236 FMNH + 8 DZUP

DZUP - Coleção de Entomologia Pe. J. S. Moure, Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Brazil (L. M. Almeida);
FMNH - Field Museum of Natural History, Chicago, USA (A. F. Newton);
IRSNB- Institut Royal des Sciences Naturelles de Belgique, Bruxelas, Belgium (Y. Gérard);
ZMHB- Museum für Naturkunde der Humboldt-Universität, Berlim, Germany (J. Frisch).

Type material was examined for all names listed within *Hypotelus* by Herman (2001) and Caron *et al.* (2012), except for *H. praecox* Erichson, 1840 (2 syntypes deposited in ZMHB), *H. micans* Sharp, 1876 (holotype deposited in British Museum of Natural History,

London, England, BMNH), *H. marginatus* (2 syntypes deposited in BMNH), and *H. laevis* (Solsky, 1872) (neotype designed by Caron *et al*. 2012, deposited in IRSNB).

Labels from type material are organized in sequence from top to bottom and enumerated, which the data from each label are enclosed within double quotes (“ ”), a forward slash (/) separates lines, and information enclosed by square brackets ([ ]) provides added details about the labels. Information from labels of additional material is organized, when complete, as follows: country: district/state/province, number of specimens, locality, extra information, date, collector (abbreviation of institution). All information from labels is listed as found, with added details enclosed by square brackets ([ ]) and comments in italics. Distribution of each species is listed in the text by country and followed by, when possible, district/state/province enclosed by parentheses ‘( )’. Biological notes about each species are cited from labels and from cited literature.

Morphology

The morphological terminology adopted is from Naomi (1987–1990, 2015), Caron *et al*. (2012) and Grebennikov and Newton (2012). The numbering of abdominal segments is according to morphological origin and not indicate visible segments. Measurements were done under stereoscopic microscope Nikon SMZ1000, in which the following abbreviations are used: BL, body length (from anterior margin of head capsule to posterior margin of tergite 8); BW, body width (across humeral region); PL, pronotum length (maximum); PW, pronotum width (maximum); EL, elytron length (maximum).

The species concept adopted is from Wheeler and Platnick (2000), which the concept defines species as the smallest aggregation of populations diagnosable by an unique combination of character states. Therefore, we consider here, mainly, abdominal segments 8 to 10 and genitalia characters to delimit species. The diagnosis adopted is from ICZN (1999, glossary).

Most features were observed from dried pinned specimens. Apical abdominal segments, including genitalia, were studied for all species after dissection, except for *H. andinus* (Bernhauer, 1917). Mouthparts were not dissected for the species which only holotypes or syntypes have been available.

The morphological study adopted was the commonly used from rove beetles. The dried specimens were first macerated in double boiler for 2-3 minutes for cleaning and all or

part (apical abdominal segments) subsequently cleared in hot 10% KOH solution for 1-2 minutes according to the body size, then washed in Acetic Acid Glacial solution, and dissected in glycerol on concavity slide. After morphological study, dissected parts were fixed on plastic board covered with Canada balsam and pinned with the specimen. For type species, this procedure used only on apical abdominal segments. The dissections were carried out under a Nikon SMZ1000 or Leica M165C stereoscopic microscope. Drawings were made under a stereoscopic microscope, Nikon SMZ1000 or Leica M165C, and with a compound microscope, Olympus BX50, all with a drawing tube attached. Photo images were taken using a stereoscopic microscope Leica EZ4 with Moticam 5 CMOS digital camera. Final editing of drawings and photographs were performed in Adobe Illustrator CS6 and Adobe Photoshop CS3 software, version 10.0.

Maps

Distributional maps (Geographical records) were made for all species based on locality information from labels and literature records. Specimens' localities without geographic coordinates in the labels were searched on GeoNames database. The maps were performed in QGIS software, version 2.10.1. Countries without precise locality were only informed in color in the maps, however without any locality plotted.

RESULTS

Taxonomic revision

Genus ***Hypotelus*** Erichson, 1839

[11 species; Neotropical and Nearctic Regions]

Hypotelus Erichson, 1839: 31 (without included species); Erichson, 1840: 840 (first included species: *pusillus*, *praecox*; characters); Duponchel, 1841: 57 (*H. pusillus* as type species); Lacordaire, 1854: 130 (characters, notes, list of species); Fauvel, 1864: 38

[=1865: 42] (characters, key to species); Sharp, 1887: 710 (notes, Mexican and Central American species); Bernhauer & Schubert, 1910: 9 (world catalog, 7 species); Blackwelder, 1943: 41 (characters); Blackwelder, 1944: 101 (checklist of species from Mexico, Central and South America, and the West Indies); Frank, 1986: 365 (checklist of species of Florida); Newton *et al*., 2000: 376 (1 Nearctic species, notes, characters in key); Herman, 2001: 1785 (bibliography, complete review of literature); Navarrete-Heredia *et al.* 2002: 207 (notes, Mexican species, characters in key); Caron *et al*., 2012: 550 (new synonyms). **Type species**: *Hypotelus pusillus* Erichson, 1840 (fixed by subsequent designation by Duponchel, 1841).

Antropiestus Bernhauer, 1917: 45 (as subgenus of *Piestus*); Scheerpeltz, 1952: 295 (subgenus of *Piestus*); Herman, 2001: 1788 (subgenus of *Piestus*); Caron *et al*., 2012: 551 (as junior synonym of *Hypotelus*). **Type species**: *Piestus* (*Antropiestus*) *andinus* Bernhauer, 1917 (fixed by original designation).

Eccoptopiestus Scheerpeltz, 1952: 295 (as subgenus of *Piestus*); Herman, 2001: 1788 (subgenus of *Piestus*). Caron *et al*., 2012: 550 (as junior synonym of *Hypotelus*). **Type species**: *Piestus laevis* Solsky, 1872 (fixed by original designation).

Diagnosis

Hypotelus may be distinguished from *Piestus* and *Siagonium* (Piestinae) and *Lispinus* and *Eleusiss* (Osoriinae) by the body slightly cylindrical (Figs. 1, 2); antennomeres 5-11 entirely with microsetae and some long dispersed setae (Fig. 21); labium with two pairs of conspicuous long setae on anterior margin near of median sclerotinized plate of ligula (Figs. 28, 29); mentum with anterior angles conspicuously emarginated (Fig. 28); elytra with one longitudinal striae closely on elytral suture (Fig. 1); abdominal segments 3-6 with two pairs of paratergites (Figs. 1, 7-16) and abdominal segment 7 visibly the longest one.

Redescription

BL: 2.1–6.1mm, BW: 0.5–1.3mm. Body slightly cylindrical (Fig. 1, 7-16); dorsal surface glossy; light brown to black; elytra with same color of body, lighter or yellowish (when yellowish with some darker area); usually appendices lighter than body, except mandibles. Dorsal integument of head and pronotum with disperse fine punctures and undulate microstriae (microstriae sometimes less on disc or only on margins), or

microgranulate sculptures; elytra with disperse fine punctures and only one longitudinal striae finely punctate closely on elytral suture (Fig. 1).

Male. **Head**. Somewhat pentagon in form with front slightly deflected and one slightly protuberance on each external lateral half (Fig. 3), some species with two slightly pointed frontal processes or long frontal processes (Fig. 17-20); eyes somewhat prominent in dorsal view and somewhat rounded, 1.2 to 1.3 times as long as wide, 1.5 to 2 times as long as temples and with two pairs of long setae near dorsal margin (Fig. 2). Antennae inserted ventrally, reaching humeral angle of elytra or almost apex of elytra (Figs. 1-4); antennomeres 5–11 entirely with microsetae and some long dispersed setae, may has longest setae on alternate antennomeres or not (Figs. 21, 22); scape the longest, prominent tooth on internal face or not, sometimes this tooth moderate; antennomeres 2 and 3 with same length or antennomere 3 longer than 2; antennomere 4 shortest; antennomeres 5-11 gradually increasing in length toward antennal apex; antennomeres 5-10 wider than long. Labrum transverse (Fig. 23), anterior margin with median third deeply emarginate, six long setae medially; each lateral third, two long setae. Epipharynx dorsally short and long fringes on internal margin (Fig. 23). Mandibles symmetrical and curved at apex (Fig. 25); inner margin smooth or teethed; dorsal teeth absent or present (Fig. 26); prostheca developed. Maxillary cardo wider than long, somewhat subquadrate and base club-shaped (Fig. 27); stipes triangular; galea extending slightly beyond apex of lacinia; lacinia with dense short setae on apex; galea narrower than lacinia, dense short setae on apex and some long setae on external margin near apex; maxillary palpus with palpomere 1 the shortest, palpomere 3 wider than long and 4 longer than 2 and 3 combined. Labium with ligula slightly emarginate on the middle with pointed lobe on each anterior angle and two pairs of conspicuous long setae on anterior margin near of median sclerotinized plate of ligula (Figs. 28, 29). Mentum pentagon in form, 1.6 to 2 times wider than long and anterior angles conspicuously emarginated. Gular sutures joined on apical two-third (Fig. 4).

Thorax. Pronotum wider than long, PW/PL = 1.2 to 1.5; anterior angles rounded and generally slightly prominent (Fig. 3); apical half with somewhat curved sides and basal half gradually narrowing toward the base (except *H. laevis* and *H. andinus*, Figs. 15, 16); complete internal mid-longitudinal ridge and slight longitudinal median sulcus, on basal half or to entire length of pronotum (Fig. 3); one pair of conspicuous setae on anterior margin. Prosternum with anterior margin truncate (Fig. 4); prosternal process long and curved toward apex and apex easily visible between the procoxae; protrochantin visible externally; postcoxal

hypomeral projection acute and long. Scutellum visible, developed and somewhat triangular. Elytra somewhat longer than wide, EL/BW = 1.1 to 1.3, covering totally, partially or not the abdominal segment 3; slightly emarginate at the middle (Figs. 1, 7-16); two evident setae and a series of short setae on posterior margin. Hind wings fully developed. Mesoventrite process about half length of mesocoxae, acute and rounded at apex, mesocoxae narrowly separated (Fig. 5); metaventrite process wider and slightly shorter than mesoventrite process; posterior margin of metacoxa slightly emarginate. Procoxae transverse and contiguous (Fig. 4, 30); protrochanter small and subtriangular; profemur robust and slightly flat anteroposteriorly, protibia with apex wider than base, longitudinal row of robust spines on beyond apical half of external margin and at apex, internal margin slightly emarginate and longitudinal rows of robust setae, robust spine on the internal angle of apex; tarsomeres 1–4 subequal in length, setae at apex, tarsomere 5 the longest, the same length as 1-4 tarsomeres combined, slightly curved. Mesocoxae separated, each globose (Fig. 4, 31), and metacoxae contiguous (Fig. 5, 32), each transverse and subtrapezoidal; meso- and metatrochanter subtriangular; meso- and metafemur slightly flat anteroposteriorly and somewhat curved dorsally; meso- and metatibiae with apex wider than base, metatibia longer than mesotibia; apical two-thirds of mesotibiae with longitudinal rows of robust spines and apical one-quarter in metatibiae, apex with two robust spines, internal the longest; tarsus similar to anterior legs, except in one species, *H*. sp. nov. 1 with metatarsomeres dilated (Fig. 33).

Abdomen. Abdominal segments 3-6 parallel sides (Fig. 1); tergite 1 consists of a pair of triangular plates and they are completely separated from each other by submembranous and weakly pigmented (Fig. 34); tergite 2 short, slightly less pigmented than 3 and hidden under elytra; segments 3-6 with two pairs of paratergites and segment 7 with only one pair (Figs. 1, 7-16); abdominal segment 7 at least 2 times longer than each precedent segment; tergites 4-6 on each half side with some pairs of setae; sternite 1 reduced and inconspicuous (Fig. 35); sternite 2 sclerotized and fused with sternite 3, both with longitudinal median carina (intercoxal), complete on tergite 2 and projected over 3, and tergite 3 only on basal half; tergite 8 with posterior margin truncate to curved and one pair of internal plates at lateral margin (Fig. 36); sternite 8 with posterior margin truncate to rounded, weakly pigmented or not, with short setae or not; tergite 9 separated by tergite 10 and with short ventral struts (Fig. 46); sternite 9 composed by a single median sclerite, symmetrical, almost 3 times longer than wide, anterior margin acute, posterior margin truncate and with two pairs of long setae (Fig. 37); tergite 10 at posterior margin emarginate to slightly rounded, weakly pigmented or not, with short fringes and some setae on each half side (Figs. 47-49). Aedeagus with median lobe

curved in lateral view, sometimes bulbous base in ventral view, lateral lobes developed (Figs. 50-65).

Female. In general, similar to male, except: posterior margin of sternite 8 variable in shape, slightly pointed to emarginate and with short setae (Figs. 66-75) tergite 9 without ventral struts; sternite 9 as ovipositor consisting of pair of weakly pigmented hemisternites and pair of more apical coxites, and with many long setae on apex (Fig. 38). Basal pouch variable in form and connected to ovipositor (Figs. 75, 80, 84, 89); spermathecal duct short, weakly sclerotized and inserted lateroapically on basal pouch; spermatheca very small, weakly sclerotized and sometimes difficult to found.

Sexual dimorphism

Some species are sexually dimorphic in relation to the frontal processes of head and antennae. The males have shorter distance between pointed frontal processes than females in *H.* sp. nov. 2 (Figs. 17, 18); and in *H. laevis* the pair of frontal process is generally more developed on males than females (Figs. 19, 20). About the antennae, males have longer than females (Figs. 21, 22) and on males, on antennal scape, there is a prominent tooth on internal face and setae alternated on antennomeres.

Distribution

Nearctic region: United States of America (only *H. pusillus*, before cited as *H. hostilis*), and Neotropical region: Mexico, Guatemala, Costa Rica, Panama, Colombia, Venezuela, French Guiana, Ecuador, Peru, Bolivia, Brazil, Paraguay and the Caribbean islands (Cuba, Jamaica, Dominican Republic, Saint Vincent and the Grenadines, Grenada and Trinidad and Tobago) (Fig. 92).

Hypotelus is a Neotropical genus *sensu* Morrone (2014). The unique species in Nearctic region occurs in southeast of Florida, very close with Caribbean islands.

Biological notes

The species of *Hypotelus*, as well as the other species of Piestinae, are commonly found associated with organic material in a decomposition process, mainly under bark of tree. *Hypotelus* has been found on or under bark of decaying logs, on rotten palm, in leaf litter, in

cactus and in bamboo shoots. *Hypotelus* species have also been collected by flight intercept and Malaise traps, Berlese and Winkler extraction of leaf litter, and pitfall.

Phylogenetic notes

Following the phylogenetic study of Grebennikov and Newton (2012), *Hypotelus* is more evolutionary related to the Osoriinae genera than "Piestinae", as *Lispinus* and *Eleusis*. So, in this work we prefer to compare the diagnostic characters of *Hypotelus* with these genera, in which *Hypotelus* differs from *Lispinus* by the body slightly cylindrical; eyes prominent in dorsal view; gular sutures separated by gular sclerite (in part of their length); anterior margin of pronotum wider than posterior margin; procoxae contiguous, not separated by prosternal process; abdominal segments 3-6 not fused, separated by sutures (two pairs of paratergites); abdominal sternites 1-2 with intercoxal carina; and from *Eleusis* by the gular sutures complete, extending anteriorly to bucal cavity; pronotum not so strongly narrowing toward the base; abdominal segments 3-6 not fused, separated by sutures (two pairs of paratergites); abdominal sternites 1-2 with intercoxal carina.

About the close relation of *Hypotelus* with Osoriinae, all species of the genus have the homoplasies examined by those authors: inner margin of mandibles without preapical teeth, cervical sclerites slender, elytra without non-sutural striae and mesothoracic anapleural suture absent.

However, the same authors (Grebennikov and Newton 2012) alert the necessity of a specific study for the Piestinae phylogeny, increasing the knowledge already given by Caron *et al*. (2012). In this way, we also compare the diagnostic characters of *Hypotelus* with the only two Neotropical genera of Piestinae, in which *Hypotelus* may be distinguished from *Piestus* and *Siagonium* by the gular sutures complete, extending anteriorly to bucal cavity and fused for part of their length; lacking mandibular cavities; elytra without non-sutural striae.

Finally, Caron *et al.* (2012) transferred two older *Piestus* species to *Hypotelus*, *H. laevis* and *H. andinus*, based on five diagnostic characters that they share with the type species, *H. pusillus*. From these five characters, all of them were confirmed as diagnostic characters for *Hypotelus.* Therefore, in this work we maintain the two specific names transferred by Caron *et al.* (2012) in *Hypotelus*, confirm and increase the diagnostic characters list (see diagnosis of the genus).

Key to species of ***Hypotelus***

1. Disc of pronotum with deep large depression (Fig. 16). Known from Colombia, Ecuador and Bolivia ..... *H. andinus* (Fig. 16)
   Disc of pronotum without depression 2
2.(1) Elytra and pronotum similar in color (Fig. 12) 3
   Elytra conspicuously lighter than pronotum (Fig. 1) 6
3.(2) Head with pointed frontal processes as long as antennal scape (Figs. 19, 20). Known from Bolivia and Peru ..... *H. laevis* (Fig. 15)
   Head without or with frontal processes, not as long as antennal scape (Figs. 3, 17) 4
4.(3) Male, sternite 8 with posterior margin somewhat short three-pronged at the middle (Fig. 44); tergite 10 of female weakly sclerotized on lateral and posterior margin (Fig. 81). Known from Panama …… *H. testaceus* (Fig. 9)
   Male, sternite 8 with posterior margin rounded; tergite 10 of female weakly sclerotized just on posterior margin 5
5.(4) Male, aedeagus, apex of median lobe in ventral view truncate and with a small tooth at the middle (Fig. 61); female, posterior margin of sternite 8 emarginate except in the middle region (Fig. 72). Known from Peru ..... *H.* sp. nov.2 (Fig. 12)
   Male, aedeagus, apex of median lobe in ventral view with smooth line forming one small tooth at the middle (Fig. 59); female, posterior margin of sternite 8 with two small lateral projections (Fig. 71). Known from Costa Rica, Panama, Colombia and Venezuela ……..... *H. praecox* (Fig. 11)
6.(2) Body brownish with elytra entirely reddish. Known from Guatemala, Colombia and Venezuela …….... *H. marginatus* (Fig. 8)
   Body light to dark brown with elytra yellowish 7
7.(6) Elytra with basal darker area somewhat an invert triangle reaching the middle of elytral suture. Known from Colombia and Brazil ..... *H. micans* (Fig. 10)
   Elytra with different color pattern 8
8.(7) Elytra with basal and apical transversal darker area. Known from Peru ……...……. *H.* sp. nov.3 (Fig. 14)
   Elytra with only basal transversal darker area 9

9.(8) Male, sternite 8 with posterior margin weakly sclerotized, aedeagus with apex truncate in lateral view (Figs. 43, 52); female, sternite 8 with posterior margin rounded (Fig. 67). Known from Caribbean islands ..... *H. insulanus* (Fig. 7)
Male, sternite 8 without posterior margin weakly sclerotized, aedeagus with apex directed ventrally in lateral view; female, sternite 8 with posterior margin slightly pointed at the middle or somewhat truncate 10

10.(9) Male, tergite 10 weakly sclerotized on lateral and posterior margin (Fig. 49); female, sternite 8 with posterior margin somewhat truncate (Fig. 73). Known from Panama ……. *H*. sp. nov. 1 (Fig. 13)
Male, tergite 10 weakly sclerotized just on posterior margin (Fig. 46); female, sternite 8 with posterior margin slightly pointed at the middle (Fig. 66). Known from Florida and almost all countries of Neotropical region ……..... *H. pusillus* (Fig. 1)

The species of *Hypotelus* are arranged below in alphabetical order.

Hypotelus andinus (Bernhauer, 1917)
(Fig. 16, 94)

Piestus (*Antropiestus*) *andinus* Bernhauer, 1917: 45 (original description, type locality: ‘West-Kolumbien: Umgebung von Cali am Rio Cauca’); Scheerpeltz, 1933: 993 (distribution); Scheerpeltz, 1952: 295 (characters, distribution); *Piestus andinus*: Blackwelder, 1944: 100 (distribution); Herman, 2001: 1788 (distribution); Newton et al., 2005: 37 (distribution).

Piestus (*Antropiestus*) *strigipennis* Bernhauer, 1921: 65 (original description, type locality; ‘Bolivien: Yuracaris’); Scheerpeltz, 1933: 993 (distribution); Scheerpeltz, 1952: 295 (characters, distribution); Caron *et al*., 2012: 551 (as junior synonym).

Piestus strigipennis: Blackwelder, 1944: 101 (distribution); Herman, 2001: 1795 (distribution).

Hypotelus andinus: Caron *et al*., 2012: 551 (redescription, lectotype designed, distribution, notes).

Type material

Piestus (*Antropiestus*) *andinus* Bernhauer, 1917. Lectotype deposited in FMNH, male [damaged specimen: without right anterior leg] with labels: (1) "♂" [white label, handwritten, together with the specimen]; (2) "Columbia occ/Cali. Fassl" [white label/printed in black]; (3) "Antropiestus/andinus/Brnh. Typus" [light yellow label, handwritten]; (4) "♂" [white label, printed in black]; (5) "LECTOTYPE/Piestus andinus/Bernhauer, 1917/det. E. Caron, 2009" [red label, printed in black]; (6) "Chicago NHMus/M.Bernhauer/Collection" [white label, printed in black]; (7) "FMNH-INS/0000 063 446" [white label, printed in black]; (8) "Photographed/Kelsey Keaton 2014/Emub Catalog" [blue label, printed in black]. Note: Caron et al. (2012) cited one paralectotype deposited in NMW (Naturhistorische Museum Wien, Wien, Austria).

Piestus (*Antropiestus*) *strigipennis* Bernhauer, 1921. Syntype deposited in FMNH (Caron *et al.* 2012) (not examined).

Diagnosis

Hypotelus andinus may be easily distinguished from other species of *Hypotelus* by the conspicuous and deep large depression at middle of pronotum (Fig. 16).

Redescription

BL: 6.1 mm, BW: 1.3 mm. Body slightly cylindrical; dorsal surface matte, except elytra; entirely black with legs a little lighter (Fig. 16). Dorsal integument of head and pronotum with fine punctures and microgranulate sculptures; elytra with one longitudinal striae finely punctate and closely to internal margin, conspicuous only on basal half; metaventrite and abdomen with fine punctures and microgranulate sculptures.

Male. **Head**. With five moderately sized punctures with long setae on basal half of dorsal margin of eyes. Antennae almost reaching apex of elytra; every antennomeres with some long setae, setae on internal face are longest; antennomeres 2 and 3 with same length; 5-11 gradually increasing in length toward antennal apex. Labrum with median third deeply emarginate, six long setae medially; each lateral third, four long setae, two apical and two subapical. Mandibles symmetrical, one acute tooth on each inner margin. Mentum 2 times wider than long and anterior angles emarginated.

Thorax. Pronotum wider than long (PW/PL = 1.25); anterior angles rounded and slightly prominent; apical two-thirds with somewhat curved sides and basal one-thirds

gradually narrowing toward the base; complete internal mid-longitudinal ridge and longitudinal median sulcus conspicuous; conspicuous and deep large depression at middle. Elytra somewhat longer than wide (EL/BW = 1.2), covering tergite 3. Abdominal tergites 4-6 on each half side with four setae, one shortest.

Apical abdominal segments 8 to 10 and genitalia were not studied, but according to Caron *et al*. (2012) the shape of the structures are: sternite 8 with posterior margin truncate; tergite 9 with short ventral struts; tergite 10 with some long setae on apex and posterior margin with short fringes, basal half not divided longitudinally; sternite 9 with two pairs of long setae and truncate apex. Median lobe of aedeagus with bulbous base in ventral view and somewhat globose apex in lateral view, tube closed in dorsal view; lateral lobes exceed little apex of median lobe and curved on apex in lateral view (see Figs. 248-250).

Female. Not examined. According to Caron *et al*. (2012) the female is similar to male except for: elytra a little shorter, covering only basal half of tergite 3; abdominal sternite 8 with pointed apex and short setae on posterior margin; tergite 10 divided longitudinally on basal half (see Fig. 151); ovipositor consisting of pair of weakly pigmented hemisternites and pair of more apical coxites, and with many long setae on apex (see Fig. 155). Spermatheca unknown.

Geographical records

Colombia. Caron *et al*. (2012) listed from Colombia (Boyacá), Ecuador and Bolivia (Beni) (Fig. 94).

Biological notes

Hypotelus andinus has been collected in Malaise trap.

Hypotelus insulanus Bierig, 1934

(Figs. 7, 43, 47, 52-53, 67, 77-78, 94)

Hypotelus insulanus Bierig, 1934: 343 (original description, type locality: “Cuba; Aspiro (pie de la Sierra del Rosario)”); Blackwelder, 1943: 42 (review; distribution); Herman, 2001: 1785 (distribution); Peck, 2005: 65 (distribution).

Type material

Hypotelus insulanus Bierig, 1934. Five syntypes deposited in FMNH. One male (photo) with labels: (1) "♂" [white label, handwritten, together with the specimen]; (2) "Coll. Alex.Bierig/Aspiro XI.1934" [old white, first line printed. Locality and date, handwritten]; (3) "Prov.P. Río,CUBA" [old white, printed. "P. Río", handwritten]; (4) "insulanus/Brg." [old white, handwritten]; (5) "insulanus/Bier.[probably Cotype]/don.C.Koch" [red label, handwritten]; (6) "Chicago NHMus/M.Bernhauer/Collection" [white label, printed in black]; (7) "FMNHINS/0000 131 008" [white label, printed in black]; (8) "Photographed/Kelsey Keaton 2014/Emu Catalog" [blue label, printed in black]. One male, body glued on white board [damaged specimen: without right hind leg], dissected [labrum, mandibles, labium, left hind tarsus, abdominal segments 8 to 10 and aedeagus fixed on plastic board and covered with Canada balsam], with labels: (1) "Aspiro, 30.III.34./Cuba" [old white, handwritten]; (2) "Field Mus. Nat. His./1966/A. Bierig Colln./Acc. Z-13812" [white label, printed in black]. One female, dissected [abdominal segments 8 to 10 and spermatheca fixed on plastic board covered with Canada balsam], with labels: (1) "Aspiro, 30.III.34./Cuba" [old white, handwritten]; (2) "Field Mus. Nat. His./1966/A. Bierig Colln./Acc. Z-13812" [white label, printed in black]. One specimen, sex undetermined, with labels: (1) "Aspiro, 30.III.34./Cuba" [old white, handwritten]; (2) "Field Mus. Nat. His./1966/A. Bierig Colln./Acc. Z-13812" [white label, printed in black]. One specimen, sex undetermined, with labels: (1) "Rangel, 12.IV.34./Cuba" [old white, handwritten]; (2) "TYPUS" [black label, handwritten]; (3) "Hypotelus/insulanus/Brg." [old white, handwritten]; (4) "Field Mus. Nat. His./1966/A. Bierig Colln./Acc. Z-13812" [white label, printed in black]. We received five specimens from FMNH from which we are considering all of them as syntypes. However we alert here which all of them have different date of Bierig (1934), three specimens of 30.III.34, one XI. 34 and one 12.IV.34. The last one from different locality "Rangel".

Diagnosis

Hypotelus insulanus is similar to *Hypotelus pusillus* and differs by the abdominal segments 8, which tergite 8 of male with posterior margin somewhat truncate and sternite 8 with posterior margin weakly pigmented (Fig. 43); sternite 8 of female with posterior margin rounded (Fig. 67).

Redescription

BL: 2.1–3.0 mm, BW: 0.5–0.7 mm. Body slightly cylindrical; dorsal surface glossy; light brown to brown, except elytra yellowish; appendices lighter than body, except mandibles. Dorsal integument of head and pronotum entirely with fine punctures and undulate microstriae; elytra with disperse fine punctures and only one longitudinal striae finely punctate closely on elytral suture.

Male. **Head**. With two pairs of long setae near dorsal margin of eyes. Antennae reaching half-length of elytra; antennomeres 3, 5, 7, 9 and 11 with the long setae on internal face are longest; scape with prominent tooth on internal face; antennomeres 2 and 3 with same length, 5-11 gradually increasing in length toward antennal apex. Mandibles symmetrical and curved. Mentum pentagon in form, 1.6 times wider than long and anterior angles conspicuously emarginated.

Thorax. Pronotum wider than long (PW/PL = 1.3); anterior angles rounded; apical half with somewhat parallel sides and basal half gradually narrowing toward the base; complete internal mid-longitudinal ridge and slight longitudinal median sulcus only on basal half. Elytra somewhat longer than wide (EL/BW = 1.1), covering partially or not the abdominal segment 3.

Abdomen. Abdominal tergites 4-6 on each half side with one pair of setae, external the longest; tergite 8 with posterior margin somewhat truncate and one pair of internal plates at lateral margin; sternite 8 with posterior margin rounded and weakly pigmented (Fig. 43); tergite 9 with short ventral struts; sternite 9 with posterior margin truncate and with two pairs of long setae, the internal longest; tergite 10 at posterior margin emarginate, with short fringes and four setae on each half side (Fig. 47). Median lobe of aedeagus with slightly bulbous base in ventral view and curved shape in lateral view (Figs. 52-53); apex rounded in ventral view.

Female. Similar to male except for: antennae shorter, scape without prominent tooth on internal face and neither the longest setae on antennomeres 3, 5, 7, 9 and 11; abdominal tergite 8 with posterior margin rounded; sternite 8 without posterior margin weakly pigmented and with short setae on posterior margin (Fig. 67); tergite 9 without ventral struts; tergite 10 slightly rounded at apex (77); basal pouch as *H. pusillus*; ovipositor consisting of pair of weakly pigmented hemisternites and pair of more apical coxites, and with many long setae on apex; spermatheca as Fig. 78.

Geographical records

Cuba (Artemisa). Blackwelder (1943) listed the species also from Cuba (Cayamas), Jamaica (Saint Thomas and Santa Isabel), Hispaniola: Dominican Republic (La Vega) and Saint Vincent; and Herman (2001) expended from West Indies [Caribbean islands]. Peck (2005) listed Cienfuegos "Ci" as the province of Cayamas (Cuba) and cited the province Pinar del Rio "PR" as the type locality of this species (94).

Biological notes

In the original description Bierig (1934) commented that five specimens were found underbark the fallen "almácigo", by this author, apparently they were preying flies larvae, but this behavior has not confirmed until now.

Blackwelder (1943) cited that the Cuban specimens collected "on ceiba"; that is, on a silk cotton tree, presumably under the bark; the Jamaica specimens were taken from under bark of the silk cotton tree and tropic birch, as well as flying at dusk.

Hypotelus laevis (Solsky, 1872)

(Figs. 15, 19, 20, 26, 93)

Piestus laevis Solsky, 1872: 311 (original description: "Monte-Rico (Pérou)"); Blackwelder, 1944: 100 (distribution, error: Solsky, 1871); Herman, 2001: 1791 (distribution).

Piestus (*Piestus*) *laevis*: Bernhauer & Schubert, 1910: 7 (distribution, error: Solsky, 1871).

Piestus (*Eccoptopiestus*) *laevis*: Scheerpeltz 1952: 295 (characters, distribution, error: Solsky, 1871).

Hypotelus laevis: Caron *et al*., 2012: 550 (species name transferred to *Hypotelus*, neotype designed, redescription, notes, distribution).

Type material

Hypotelus laevis (Solsky, 1872), neotype deposited in IRSNB (Caron *et al.* 2012) (not examined).

Additional material

PERU: Cusco: 2 specimens, Consuelo, Manu rd. km 165, ex rotten palm fruit, Winkler, 1.X.1982, L. E. Watrous and G. Mazurek coll. (FMNH); 1 specimen, the same

locality, date and collector, ex litter at rotten logs (FMNH); 2 specimens, the same locality and collector, 3.X.1982 (FMNH); 2 specimens, the same locality and collector, 4.X.1982 (FMNH); 2 specimens, the same locality and collector, 5.X.1982 (FMNH); 1 specimen, Campamento Comerciato 12º47'S 73º22'W 1350m, pitfall, 23.XI.2002, J. Grados (FMNH).

Diagnosis

Hypotelus laevis may be easily distinguished from others species of *Hypotelus* by a pair of broad and short pointed frontal processes on the head (Fig. 15) and well-developed dorsal teeth of mandibles, forming a bifurcate apex (Fig. 26).

Redescription

BL: 3.0–3.6 mm, BW: 0.8–0.9 mm. Body slightly cylindrical; light brown to dark brown with one-quarter apical of elytra darker (Fig. 15). Dorsal integument of head and pronotum with fine punctures and undulate microstriae; elytra with disperse fine punctures and only one longitudinal striae finely punctate closely on elytral suture.

Male. **Head**. With pair of broad and pointed frontal processes, as long as scape, and basal distance between processes narrower than basal width of each one (Fig. 19). Antennae reaching half-length; antennomeres 2 and 3 with same length, 5-11 gradually increasing in length toward antennal apex. Mandibles curved and bifurcate at apex, dorsal teeth shorter than ventral (Fig. 26); inner margin with one acute tooth at middle; prostheca well developed. Mentum pentagon in form, 2 times wider than long and anterior angles emarginated.

Thorax. Pronotum wider than long (PW/PL = 1.3); anterior angles rounded and not projected; apical two-thirds with somewhat curved sides and basal one-thirds gradually narrowing toward the base; complete internal mid-longitudinal ridge and slight longitudinal median sulcus on almost entire length of pronotum. Elytra somewhat longer than wide (EL/BW = 1.2), covering totally or partially the abdominal segment 3.

Abdomen. Abdominal tergites 4-6 on each half side with one pair of setae, external the longest; tergite 8 with posterior margin rounded and one pair of internal plates at lateral margin; sternite 8 with posterior margin narrower and rounded; tergite 9 with short ventral struts; tergite 10 with some long setae on apex and posterior margin with short fringes; sternite 9 with posterior margin truncate and with two pairs of long setae, the internal longest. Median lobe of aedeagus with bulbous base in ventral view and curved shape in lateral view (see Figs. 246-247 in Caron *et al*. 2012).

Female. Similar to male except for: pair of frontal processes less developed than on male (Fig. 20); sternite 8 with short setae on posterior margin; tergite 9 without ventral struts; ovipositor consisting of pair of weakly pigmented hemisternites and pair of more apical coxites, and with many long setae on apex

Geographical records

Bolivia and Peru (Cusco) (93).

Biological notes

Hypotelus laevis has been collected on rotten palm and by Winkler extraction of leaf litter.

Hypotelus marginatus Sharp, 1887

(Figs. 8, 54, 55, 68, 79, 92B)

Hypotelus marginatus Sharp, 1887: 711 (original description, type locality: “Guatemala, Senhau 2500 feet”). Bernhauer & Schubert, 1910: 9 (catalog); Herman, 2001: 1785 (distribution); Newton *et al*., 2005: 37 (distribution).

Type material

The type material was not examined, deposited in BMNH. Note: In the original description Sharp (1887) specified "one pair" observed.

Additional material

COLOMBIA: 2 specimens, *no locality, date and collector* (FMNH). **VENEZUELA:** 1 specimen, *no locality and date*, Moritz coll. (FMNH).

Diagnosis

Hypotelus marginatus may be distinguished from other species of *Hypotelus* by the color pattern of body, elytra reddish and body darker (Fig. 8), male without scape modified and antennomeres 3, 5, 7, 9 and 11 with long setae on internal face.

Redescription

BL: 3.2 mm, BW: 0.8 mm. Body slightly cylindrical; dorsal surface glossy; antennae, head, pronotum and abdominal segments dark brown; elytra and appendices reddish. Dorsal integument of head and pronotum with disperse fine punctures and undulate microstriae (microstriae less on disc); elytra with disperse fine punctures and only one longitudinal striae finely punctate closely on elytral suture.

Male. **Head**. Eyes with two pairs of long setae near dorsal margin. Antenna reaching humeral angle of elytra; antennomeres 3, 5, 7, 9 and 11 with the long setae on internal face are longest; antennomeres 2 and 3 with same length, 5-11 gradually increasing in length toward antennal apex. Mandibles curved at apex.

Thorax. Pronotum wider than long (PW/PL = 1.3); anterior angles rounded and slightly prominent; apical half with somewhat parallel sides and basal half gradually narrowing toward the base; complete internal mid-longitudinal ridge and slight longitudinal median sulcus almost the length of pronotum. Elytra somewhat longer than wide (EL/BW = 1.1), covering partially or not the abdominal segment 3. Tarsal formula 5-5-5; tarsomere 5 the longest, the same length as 1-4 tarsomeres combined.

Abdomen. Abdominal tergites 4-6 on each half side with one pair of setae, external the longest; tergite 8 with posterior margin rounded and one pair of internal plates at lateral margin; sternite 8 with posterior margin rounded; tergite 9 with short ventral struts; sternite 9 with posterior margin truncate and with two pairs of long setae, the internal longest; tergite 10 at apex, weakly pigmented, with short fringes and four setae on each half side. Median lobe of aedeagus bulbous base in ventral view and curved shape in lateral view (Figs. 54-55).

Female. Similar to male except for: without the longest setae on antennomeres 3, 5, 7, 9 and 11; abdominal sternite 8 with short setae on posterior margin (Fig. 68); tergite 9 without ventral struts; ovipositor consisting of pair of weakly pigmented hemisternites and pair of more apical coxites, and with many long setae on apex; spermatheca as Fig. 79.

Geographical records

Colombia and Venezuela, both no locality given. In the original description, Sharp (1887) listed from Guatemala (Alta Verapaz, t.l.) (Fig. 94).

Biological notes

No data.

Hypotelus micans Sharp, 1876

(Figs. 10, 70, 83, 93)

Hypotelus micans Sharp, 1876: 409 (original description, type locality: “Ega”); Bernhauer & Schubert, 1910: 9 (catalog); Herman, 2001: 1785 (distribution).

Type material

The holotype was not examined, deposited in BMNH. Note: In the original description Sharp (1876) specified "a single individual".

Additional material

COLOMBIA: 1 specimen, Cali, *no date*, Fassl coll. (FMNH).

Diagnosis

Hypotelus micans may be distinguished from other species of *Hypotelus* by the big darker area in V-shaped on elytra (Fig. 10).

Redescription

BL: 2.8 mm, BW: 0.7 mm. Body slightly cylindrical; dorsal surface glossy; brownish, except elytra yellowish (with basal darker area somewhat an invert triangle reaching the middle of elytral suture) (Fig. 10); legs reddish yellow. Dorsal integument of head and pronotum with disperse fine punctures and undulate microstriae (microstriae only on margins); elytra with disperse fine punctures and only one longitudinal striae finely punctate closely on elytral suture.

Female. **Head**. Eyes with two pairs of long setae near dorsal margin. Antennae reaching humeral angle of elytra; antennomeres 2 and 3 with same length, antennomere 4 shortest and 5-10 wider than long; 11 longer than the preceding antennomeres.

Thorax. Pronotum wider than long (PW/PL = 1.2); anterior angles rounded and slightly prominent; apical half with somewhat parallel sides and basal half gradually narrowing toward the base; complete internal mid-longitudinal ridge and slight longitudinal median sulcus only on basal half; one pair of conspicuous setae on anterior margin. Elytra somewhat longer than wide (EL/BW = 1.2), not covering the abdominal segment 3.

Abdomen. Abdominal tergite 8 with posterior margin rounded and a pair of internal plates at lateral margin; sternite 8 with posterior margin sinuous and with short setae (Fig. 70); tergite 10 with lateral and posterior margins weakly pigmented, with short fringes and four setae on each half side at apex; basal pouch as *H. pusillus*; ovipositor consisting of pair of weakly pigmented hemisternites and pair of more apical coxites, and with many long setae on apex; spermatheca as (Fig. 83).

Male. Unknown (presumably).

Geographical records

Colombia. In the original description, Sharp (1876) listed from Brazil (Amazonas) (Fig. 93)

Biological notes

No data.

Remarks

In the original description Sharp (1876) described the specimen as having the antennae with “3rd joint much shorter than 2nd”. We received a single specimen from FMNH indentified as *H. micans* by Bernhauer, which we consider as *H. micans*, but observing, it has the antennomeres 2 and 3 with same length. This information should be confirmed by studying the type material. If the type has the antennal segment like described by Sharp, this species in the current study could be a new species for the genus.

Hypotelus praecox Erichson, 1840

(Figs. 11, 58, 59, 71, 93)

Hypotelus praecox Erichson, 1840: 841 (original description, type locality: "valle Araguensi Columbiae"); Fauvel, 1864: 39 [=1865: 43] (characters, distribution); Bernhauer & Schubert, 1910: 9 (catalog); Blackwelder, 1944: 101 (distribution); Herman, 2001: 1785 (distribution); Newton *et al*., 2005: 37 (distribution).

Type material

The type material was not examined, deposited in ZMHB. Note: In the original description, Erichson (1840) not specified how many specimens observed.

Additional material

COSTA RICA: Puntarenas: 1 specimen, OTS Sta. Finca Las Cruces, 4000ft., San Vito, 82º58'W 8º46'N, Berlese floor litter on slope above strem-good forest cover, 16.III.1973, J. Wagner and J. Kethley coll. (FMNH). **PANAMA: Chiriqui:** 2 specimens, Finca Lerida, nr. Boquete, 5650ft., under slab on pile of cut chip and bark, 12.III.1959, H. Dybas coll. (FMNH). **COLOMBIA:** 1 specimen, Cali, *no date*, Fassl coll. (FMNH). **VENEZUELA:** 1 specimen, *no locality, date and collector*, (FMNH); **Aragua:** 1 specimen, Parque Nac. Henri Pittier, Fst. Biol. Ranchero Grande 10º20'N 67º41'W, cloud forest 1100m, 7-13.VI.1999, Ratcliffe, Jameson, Smith and Villatoro coll. (FMNH). **ECUADOR: Pich:** 1 specimen, 16KmE St. Domingo Tinalandia, malaise-rainforest, 4.V-25.VII.1985, S and J Peck coll. (FMNH).

Diagnosis

Hypotelus praecox is similar to *Hypotelus* sp. nov. 2 and differs by the body color, lighter in *H. praecox* (Fig. 11), median lobe of aedeagus with one rounded process not abrupt at apex (Figs. 58, 59) and sternite 8 of female with two small lateral projections at posterior margin (Fig. 71).

Redescription

BL: 2.5–3.0 mm, BW: 0.6–0.8 mm. Body slightly cylindrical; dorsal surface glossy; brownish with head and elytra reddish brown and abdominal segment 7 darker than another (Fig.11). Dorsal integument of head and pronotum with disperse fine punctures and undulate microstriae; elytra with disperse fine punctures and only one longitudinal striae finely punctate closely on elytral suture.

Male. **Head**. Front with two slightly pointed frontal processes; eyes with two pairs of long setae near dorsal margin. Antennae almost reaching apex of elytra; scape with prominent tooth on internal face; antennomere 3 longer than 2; 5-11 longer than wide, with same length.

Thorax. Pronotum wider than long (PW/PL = 1.4); anterior angles rounded and slightly prominent; apical half with somewhat parallel sides and basal half gradually narrowing toward the base; complete internal mid-longitudinal ridge and slight longitudinal median sulcus only on basal half. Elytra somewhat longer than wide (EL/BW = 1.1), covering partially or totally the abdominal segment 3.

Abdomen. Abdominal tergites 4-6 on each half side with one pair of setae, external the longest; tergite 8 with posterior margin rounded and one pair of internal plates at lateral

margin; sternite 8 with posterior margin narrower and rounded, with short setae except in the middle region; tergite 9 with short ventral struts; sternite 9 with posterior margin truncate and with two pairs of long setae, the internal longest; tergite 10 at posterior margin with four setae on each half side and short fringes. Median lobe of aedeagus with bulbous base in ventral view and curved shape in lateral view (Fig. 58-59); slightly triangular at apex and with one rounded process not abrupt on median region.

Female. Similar to male except for: antennae shorter, with antennomeres 5-10 shorter in length; scape without prominent tooth on internal margin; abdominal sternite 8 with posterior margin with two small lateral projections and short setae (Fig. 71); tergite 9 without ventral struts; tergite 10 weakly pigmented at apex; basal pouch forming a narrow duct at basal half and apical half bulbous; ovipositor consisting of pair of weakly pigmented hemisternites and pair of more apical coxites, and with many long setae on apex; spermatheca with globose capsule.

Geographical records

Colombia (Santander), Costa Rica (Puntarenas), Ecuador (Pich), Panama (Chiriqui) and Venezuela (Aragua). Blackwelder (1944) listed from Brazil, but he puts as doubtful occurrence (93).

Biological notes

The specimens has been found in cloud and rain forests, under slab on pile of cut chips and bark, floor litter on slope above stream-good forest cover. Some specimens were collected by Berlese extraction of leaf litter and Malaise trap.

Hypotelus pusillus Erichson, 1840

(Figs. 1-6, 21-23, 25, 27, 28, 30-32, 34-38, 39, 42, 46, 50, 51, 66, 75, 76, 92)

Hypotelus pusillus Erichson, 1840: 841 (original description, type locality: “Brasilia”); Duponchel, 1841: 57 (fixed *Hypotelus pusillus* as type species of the genus); Fauvel, 1864: 38 [=1865: 42] (characters, distribution); Bernhauer & Schubert 1910: 9 (catalog); Herman, 2001: 1786 (catalog, distribution); Navarrete-Heredia *et al*., 2002: 208 (distribution).

Hypotelus hostilis Fauvel, 1864: 39 [=1865: 43] (original description, type locality: “Teapa, Mexico”); Sharp, 1887: 710 (characters, notes, distribution); Bernhauer & Schubert, 1910: 9 (catalog); Newton *et al*., 2000: 376 (distribution); Herman, 2001: 1785 (distribution); Navarrete-Heredia *et al*., 2002: 208 (notes, distribution). **New synonym.**

Hypotelus lucidus Sharp, 1887: 710 (original description, type locality: “Panama, Bugaba”); Bernhauer & Schubert, 1910: 9 (catalog); Herman, 2001: 1785 (distribution). **New synonym.**

Type material

Hypotelus pusillus Erichson, 1840. Three syntypes deposited in ZMHB, males, one syntype with labels: (1) “6820” [old white label, printed in black]; (2) “pusillus/Er./Brasil” [green label, Erichson's handwritten]; (3) “SYNTYPUS/Hypotelus/pusillus Erichson, 1840/labeled by MNHUB 2013” [red label, printed in black]. Two syntypes with labels: (1) “Hist.-Coll. (Coleoptera)/Nr. 6820/Hypotelus/pusillus Erichs./Brasil. - Cuba/Zool Mus. Berlin” [green label, printed in black]; (2) “SYNTYPUS/Hypotelus/pusillus Erichson, 1840/labeled by MNHUB 2013” [red label, printed in black]. Note: In the original description, Erichson (1840) did not specify how many specimens he used for description. We received three specimens with type labels "Syntypus" from ZMHB from which we are considering all of them as syntypes.

Hypotelus hostilis Fauvel, 1864: 39 [=1865: 43]. Syntype, sex undetermined, with labels: (1) “Teapa” [old white label, handwritten]; (2) “Carracas” [old white label, handwritten]; (3) “hostilis Fvl./type” [old white label, handwritten] (4) “R.I.Sc.N.B. 17.479/Hypotelus/Colln. et de(. A. Fauvel” [white label, printed in black; second line handwritten]; (5) “Syntype” [white label, printed in red]. Note: In the original description, Fauvel (1864) did not specify how many specimens he used for description. We observed one syntype deposited in IRSNB.

Hypotelus lucidus Sharp, 1887: 710. Syntype [dissected, body glued on white board; abdominal segments 8 to 10 and aedeagus fixed on plastic board and covered with Canada balsam] deposited in FMNH, male, with labels: (1) “Bugaba, 800 1,500 ft./Champion.” [old white label, printed in black]; (2) “B.C.A. Col. I. 2./Hypotelus/lucidus,/Sharp.” [old white label, printed in black]; (3) “Chicago Nat. Hist. Mus./(ex. D. Sharp Colln./by exchanger with/Brit. Mus. Nat. His.)” [old white label, printed in black]. Note: In the original description Sharp (1887) specify six examples. We observed one syntype deposited in FMNH, presumably another syntypes were deposited in BMNH.

Additional material

UNITED STATES OF AMERICA: Florida: 2 specimens, Biscayne Bay, *no date and collector* (IRSNB). **MEXICO:** 2 specimens, *no locality, date and collector* (1 FMNH, 1 IRSNB); **San Luis Potosí:** 1 specimen, Chapulhuacán, 24.VI.[19]41, H.S. Dybas (FMNH). **Veracruz:** 2 specimens, Tierra Blanca, *no date*, H.S. Dybas coll. (FMNH); 2 specimens, El Fortin, IV.VIII.[19]41, H.S. Dybas coll. (FMNH); 1 specimen, Matalpa, 4.III.[19]48, H.S. Dybas coll (FMNH); 1 specimen, *no locality*, 21.XII.26, D. Luftkescherung coll. (FMNH); **Chiapas:** 1 specimen, 8 mi N PuebloNuevo Solistanhuacán, 6000', under bark, 26-27.VIII.1973, A. Newton coll. (FMNH). **CUBA:** 1 specimen, *no locality, date and collector* (IRSNB). **JAMAICA: Saint Thomas:** 3 specimen, Bath Saint Thomas, Sta 389B, 6.II.1937, Chapin and Blackwerder coll. (FMNH). **GUATEMALA: Escuintla:** 8 specimens, Finca El Zapote, Zapote, elev. 2400 ft.,under bark, 9.VII.[19]48, R.D. Mitchell (FMNH); 25 specimens, *same locality and collector*, 11.VII.[19]48 (FMNH); 11 specimens, *same locality and collector*, 13.VII.[19]48 (FMNH); 1 specimen, *same locality and collector*, 16.VII.[19]48 (FMNH); 1 specimen, Zapote, *no* date, G.C. Champion coll. (IRSNB). **COSTA RICA: San José:** 6 specimens, Zapote, 11.VII.[19]38, *no collector* (FMNH); 1 specimen, Las Nubes, 19.II.1939, *no collector* (FMNH); **Cartago:** 3 specimens, Torito (Turrialba), 13-16.II.39, *no collector* (FMNH); **Limón:** 4 specimens, Reventazon, Hamburg Farm, "on dry bark of Castilla", 21.VIII.1936, F. Nevermann coll. (FMNH). **PANAMÁ: Chiriquí:** 3 specimens, Pto. Armoellles, VII.1930, *no collector* (FMNH); 1 specimen, *same locality, no date and collector* (FMNH); **Panamá:** 20 specimens, Canal Zone, Barro Colorado Island, bark and debris from fallen tree, 14.I.1959, H.S. Dybas coll. (FMNH); 16 specimens, *same locality, date and collector*, under bark (FMNH); 1 specimen, *same locality and collector*, fermented fibrous log and at light, 16.I.1959 (FMNH); 1 specimen, *same locality and collector*, debris of field, under bark of large stub, 21.I.1959 (FMNH); 7 specimens, Canal Zone, Barro Colorado I. Fairchild Trail, bark and under bark debris from fallen tree, 28.I.1959, *same collector* (FMNH). **SAINT VINCENT AND THE GRENADINES: Saint Vincent:** 1 specimen, *no locality and date*, H. H. Smith coll. (IRSNB). **GRENADA: Saint Andrew:** 1 specimen, Balthazar, *no date and collector* (IRSNB). **TRINIDAD AND TOBAGO:** 1 specimen, Balandra Bay, IV.1922, F. Psota coll. (FMNH); 3 specimens, *same locality and date*, L. R. Reynold coll. (FMNH). **COLOMBIA: Choco:** 1 specimen, Quebrada Docordo, between Cucurrupi and Noanama, Rio San Juan, beating dry foliage, 1-5.I.1969, B. Malkin coll. (FMNH). **VENEZUELA:** 1 specimen, Las Trinceras, VI.1922, L. R. Reynold coll. (FMNH). **FRENCH GUIANA: Maripassoula:** 1 specimen, Lawa River, under bark, XII.7.1963, B.

Malkin coll. (FMNH). **PERU: Lotero:** 1 specimen, 20km from Ucayali on R. Calleria, Colonia Calleria, 5.X-10.X.1961, B. Malkin coll. (FMNH); **Ucayali:** 2 specimens, Colonia Calleria, Rio Calleria 15km E Ucayali, under bark, 10.IX.10.X.1961, B. Malkin coll. (FMNH); 18 specimens, *same locality and collector*, 13.X.1961, B. Malkin coll. (FMNH); **Puno:** 1 specimen, Chimbo, *no date and collector* (FMNH); **BOLIVIA:** 2 specimens, Yuracaris, *no date and collector* (1 FMNH, 1 IRSNB); **Beni:** 4 specimens, Chacono Indian Village on Rio Benicito 66º-12º20', under bark of log, 18-27.VII.1960, B. Malkin coll. (FMNH); **Cochabamba:** 1 specimen, 17mi N Villa Tunari, 1.IV.1978, L. O'Brien, C.W. O'Brien and G.B. Marshall coll. (FMNH); 3 specimens, 20 mi SW Villa Tunari, 2.IV.1978, *same collectors* (FMNH); 1 specimen, Prov. Carrasco, Serrania de Siberia, Chua Khocha, cold forest, 2300m, baited pitfall-beef, 25.VIII-6.IX.1990, P. Parrillo and M. Ledezma coll. (FMNH); **Santa Cruz:** 1 specimen, Prov. Ichilo, "Cafezal" by Rio Quebrada Palometilla, forest clearing, under boards,5.VIII.1990, P. Parrillo and P. Bettella coll. (FMNH). **BRAZIL:** 2 specimens, Pebas, *no date and collector* (IRSNB); **Pará:** 5 specimens, Canide, Rio Gurupi, Gurupi-Uma Maranhao, 50Km E Canide, under bark, 6.IV.1963, B. Malkin coll. (FMNH) **Bahia:** 2 specimens, *no locality, date and collector* (IRSNB); 1 specimen, *no locality and date*, Fruhstofer coll. (FMNH); 1 specimen, *no locality, date and collector* (DZUP); **Rio de Janeiro:** 1 specimen, *no locality and date*, Fry coll. (FMNH); 1 specimen, Teresópolis, II.1850, Sahlberg coll. (FMNH); **São Paulo:** 1 specimen, *no locality, date and collector* (FMNH); **Paraná:** 1 specimens, Conélio Procópio, Parque Estadual Mata São Francisco, pitfall, 03.VII-14.VIII.2009, N. G. Cipola coll. (DZUP); 2 specimen, *same locality and collector*, 14.VIII-19.IX.2009 (DZUP); **Santa Catarina:** 2 specimens, Nova Teutônia, VIII.II.1965, F. Plaumann coll. (FMNH); 30 specimens, *same locality and collector, no date* (FMNH); **Blumenau:** 2 specimen, *no locality, date and collector* (FMNH); **Rio Grande do Sul:** 5 specimens, *no locality, date and collector* (FMNH). **PARAGUAY: Alto Paraná:** 1 specimen, Hohenau, *no date*, H. Jacob coll. (FMNH); 1 specimen, *same locality, no date and collector* (DZUP). **Undetermined country:** 2 specimens, Chimbo, *no date*, Rosenberg coll. (IRSNB); 1 specimen, North America, *no locality, date and collector* (FMNH).

Diagnosis

Hypotelus pusillus is similar to *Hypotelus insulanus* and *Hypotelus* sp. nov. 1. It differs from *H. insulanus* by the abdominal segments 8, which tergite 8 of male with posterior margin rounded and sternite 8 with posterior margin wider and not weakly pigmented; sternite 8 of female with posterior margin slightly pointed (Fig. 66). *H. pusillus* is easily distinguished

from *Hypotelus* sp. nov. 1 by the antennal scape with prominent tooth in internal face and the antennae longer, reaching half-length of elytra (Fig. 21).

Redescription

BL: 2.4–3.0 mm, BW: 0.6–0.8 mm. Body slightly cylindrical (Fig. 1); dorsal surface glossy; light to dark brown, except elytra yellowish (sometimes with basal darker area somewhat an invert triangle, but not reaching the middle of elytral suture); appendices lighter than body, except mandibles. Dorsal integument of head and pronotum with disperse fine punctures and undulate microstriae (microstriae less on disc); elytra with disperse fine punctures and only one longitudinal striae finely punctate closely on elytral suture (Fig, 1).

Male. **Head**. Eyes with two pairs of long setae near dorsal margin. Antennae reaching half-length of elytra; antennomeres 3, 5, 7, 9 and 11 with the long setae on internal face are longest (Fig. 21); scape with prominent tooth on internal face; antennomeres 2 and 3 with same length, 5-11 gradually increasing in length toward antennal apex. Labrum with median third deeply emarginate, six long setae medially and one pair of each external angle (Fig. 23). Mandibles symmetrical and curved at apex (Fig. 25). Labium with ligula slightly emarginate on the middle with pointed lobe on each anterior angle and two pairs of conspicuous long setae on anterior margin (Fig. 28). Mentum pentagon in form, 1.6 times wider than long and anterior angles conspicuously emarginated.

Thorax. Pronotum wider than long (PW/PL = 1.3) (Fig. 3); anterior angles rounded and slightly prominent; apical half with somewhat curved sides and basal half gradually narrowing toward the base; complete internal mid-longitudinal ridge and slight longitudinal median sulcus only on basal half; one pair of conspicuous setae on anterior margin. Elytra somewhat longer than wide (EL/BW = 1.2), covering partially or not the abdominal segment 3.

Abdomen. Abdominal tergites 4-6 on each half side with one pair of setae, external the longest; tergite 8 with posterior margin rounded and one pair of internal plates at lateral margin (Fig. 39); sternite 8 with posterior margin rounded (Fig. 42); tergite 9 separated by tergite 10 and with short ventral struts (Fig. 46); sternite 9 with posterior margin truncate and with two pairs of long setae, the internal longest; tergite 10 at posterior margin somewhat truncate, weakly pigmented, with short fringes and four setae on each half side (Fig. 46). Median lobe of aedeagus with bulbous base in ventral view and curved shape in lateral view (Figs. 50-51); apex slightly rounded in ventral view.

Female. Similar to male except for: antennae shorter, scape without prominent tooth on internal face and neither the longest setae on antennomeres 3, 5, 7, 9 and 11 (Fig. 22); abdominal sternite 8 with posterior margin slightly pointed and with short setae (Fig. 66); tergite 9 without ventral struts; tergite 10 wider at apex (Fig. 75) basal pouch as Fig. 75; ovipositor consisting of pair of weakly pigmented hemisternites and pair of more apical coxites, and with many long setae on apex (Fig. 38); spermatheca as Fig. 76.

Geographical records

United States of America (Florida), Mexico (Chiapas, Hidalgo, San Luis Potosí, Tabasco and Vera Cruz), Cuba, Jamaica (Saint Thomas), Guatemala (Escuintla), Costa Rica (Cartago, Limón, Puntarenas, San José), Panama (Chiriquí and Panamá), Saint Vincent and the Grenadines (Saint Vincent), Grenada (Saint Andrew), Trinidad and Tobago (Balandra Bay), Colombia (Choco), Venezuela, French Guiana (Maripasoula), Peru (Loreto, Ucayali and Puno), Bolivia (Beni, Cochabamba and Santa Cruz), Brazil (Pará, Bahia, Rio de Janeiro, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul) and Paraguay (Alto Paraná). Sharp (1887) listed from localities Cerro Zunil and Capetillo in Guatemala. Naverrete-Heredia *et al.* (2002) listed from Oaxaca in Mexico (92).

Biological notes

Hypotelus pusillus has been found in cold forest and forest clearing, on under bark of log, on dry bark, under boards and debris from fallen tree. Some specimens were collected by sweeping in forest at night, beating dry foliage, pitfall, fermented fibrous log and at light. Naverrete-Heredia *et al.* (2002) also listed which the species was collected in cactus.

Remarks

Some males do not have sexual dimorphism related to scape without prominent tooth on internal face neither the longest setae on antennomeres 3, 5, 7, 9 and 11 (Fig. 22). Some specimens have the median lobe of aedeagus a little narrower and pointed.

Analyzing the type material were not observed different morphological characters that justify more than one taxon, so the names *Hypotelus hostilis* and *H. lucidus* were synonymized with *H. pusillus*, this last name being senior synonym and here as a valid name of taxon.

Hypotelus testaceus Bierig, 1934

(Figs. 9, 44, 56, 57, 69, 80-82, 94)

Hypotelus testaceus Bierig, 1934: 342 (original description, type locality: "Panamá, cercanía de France Field (Zona del Canal)"); Herman, 2001: 1786 (distribution).

Type material

Hypotelus testaceus Bierig, 1934: 342. Four syntypes deposited in FMNH. One female [dissected, abdominal segments 8 to 10 were fixed on plastic board and covered with Canada balsam], with labels: (1) "France Field/VI.1930/Panamá" [white label, handwritten]; (2) "TYPUS" [black label, handwritten]; (3) "Hypotelus/testaceus/Brg." [white label, handwritten]; (4) "Field Mus. Nat. Hist./1966/A. Bierig Colln./Acc. Z13812" [white label, printed in black]; "FMNHINS/0000 131 009" [white label, printed in black]; (5) "Photographed/Kelsey Keaton 2014/Emu Catalog" [blue label, printed in black]. Three specimens, one male [dissected], one female [dissected] and one sex undetermined, whit same labels: (1) "France Field/VI.1930/Panamá" [white label, handwritten]; (2) "Field Mus. Nat. Hist./1966/A. Bierig Colln./Acc. Z-13812" [white label, printed in black]. Note: In the original description, Bierig (1934) did not specify how many specimens he observed. We received from FMNH four specimens, one specimen with label "TYPUS", but, here, we are considering all of them as syntypes.

Diagnosis

Hypotelus testaceus may be distinguished from other species of *Hypotelus* by the body color (see Redescription), male with sternite 8 at posterior margin emarginate somewhat short three-pronged at middle region (Fig. 44) and sternite 8 of female with posterior margin sinuous (Fig. 69).

Redescription

BL: 2.6–3.0 mm, BW: 0.6–0.8 mm. Body somewhat slightly cylindrical; dorsal surface glossy; reddish brown; elytra (except one-quarter apical) (Fig. 9), apical third of abdominal segments 3-6 and appendices lighter than body, except mandibles and apex of elytra. Dorsal integument of head and pronotum entirely with fine punctures and undulate microstriae; elytra with disperse fine punctures and only one longitudinal striae finely punctate closely on elytral suture.

Male. **Head**. Antennae reaching humeral angle of elytra; antennomeres 2 and 3 with same length, 5-11 gradually increasing in length toward antennal apex. Mandibles symmetrical and curved at apex.

Thorax. Pronotum wider than long (PW/PL = 1.4); anterior angles rounded and slightly prominent; apical half with somewhat parallel sides and basal half gradually narrowing toward the base; complete internal mid-longitudinal ridge and slight longitudinal median sulcus only on disc. Elytra somewhat longer than wide (EL/BW = 1.2), not covering the abdominal segment 3.

Abdomen. Abdominal tergites 4-6 on each half side with one pair of setae, external the longest; tergite 8 with posterior margin rounded and one pair of internal plates at lateral margin; sternite 8 with posterior margin emarginate somewhat short three-pronged at middle region and whit short setae (Fig. 44); tergite 9 with short ventral struts; sternite 9 with posterior margin truncate and with two pairs of long setae, the internal longest. Median lobe of aedeagus with bulbous base in ventral view and curved shape in lateral view (Figs. 56-57); apex in lateral view, curved in the opposite direction of the shape of aedeagus, forming a hook.

Female. Similar to male except for: abdominal sternite 8 with posterior margin sinuous (Fig. 69); tergite 9 without ventral struts; tergite 10 with lateral and posterior margin weakly pigmented (Fig. 81); basal pouch as Fig. 80; ovipositor consisting of pair of weakly pigmented hemisternites and pair of more apical coxites, and with many long setae on apex; spermatheca as Fig. 82.

Geographical records

Panama (Colon) (Fig. 94).

Biological Notes

No data.

Remarks

In original description, Bierig (1934) reported that the male of this species is unknown. Through the type material, we found one male and here is described for the first time.

Hypotelus sp. nov. 1

(Figs. 13, 49, 62, 63, 73, 87, 88, 94)

Type material

Holotype deposited in FMNH, male (photo), with labels: (1) “PANAMA: Chiriqui Prov.“Barca” area, Finca/Lerida nr. Boquete./III:12:1959 5650 ft.” [white label, printed in black; day and elevation handwritten]; (2) “under slab on/pile of cut chips/and bark” [white label, printed in black]; (3) “leg./H. S. Dybas” [white label, printed in black].

Paratypes: 18 specimens, deposited in FMNH. 1 male with same labels of holotype. 1 male with labels: (1) “PANAMA:Chiriqui Prov.:/nr.Nueva California, W. of Finca Palo Santo, 5000 ft./III:10:1959 H. Dybas” [white label, printed in black; number day and collector handwritten]; (2) “in torn fibers of wounded tree” [white label, printed in black]. 1 male with same first label as above. 1 male with labels: (1) “PANAMA:Chiriqui;/Cerro Punta, elev./6250ft.,III:6:1959/leg. H. S. Dybas” [white label, printed in black]; (2) “under bark of log on ground” [white label, printed in black]. 2 females with same labels of holotype. 1 specimen, sex undetermined, with labels: (1) “PANAMA:Chiriqui Priv.;/nr.Nueva California, W. of/Finca Palo Santo, 5000 ft./III:9:1959 H. Dybas” [white label, printed in black; number day and collector handwritten]; (2) “in torn fiber/of wounded/tree” [white label, printed in black]; (3) “Associated/larvae/ in alcohol” [white label, printed in black]. 1 specimen, sex undetermined, with labels: (1) “Cerro Punta (on trail to/Boquete), Chiriqui/Prov., PANAMA/alt. 6600 ft.” [white label, printed in black; elevation handwritten]; (2) “leg./H. S. Dybas/III:7:1959” [white label, printed in black, date handwritten]. 6 specimens, sex undetermined, with same labels of holotype. 1 specimen, sex undetermined, with same labels of holotype and (4) “Hypotelus/det. Newton 1994” [white label, first line handwritten, second line printed in black]. 2 specimens, sex undetermined, with labels: (1) “PANAMA: Chiriqui Prov../Cerro Punta 6900 '/III:7:1959/Leg. H.S. Dybas” [white label, printed in black; date and elevation handwritten]; (2) “under bark” [white label, printed in black]. 1 specimen, sex undetermined, with labels: (1) “PANAMA: Chiriqui Prov.,/Finca Lerida near/Boquete. alt. 5650 ft./III:14:1959, H. Dybas” [white label, printed in black; number day and elevation handwritten]; (2) “in split sapling” [white label, printed in black].

Diagnosis

Hypotelus sp. nov. 1 is similar to *H. pusillus* and differ by the antennal scape without prominent tooth in internal face and the antennae shorter, not reaching half-length of elytra

and *H.* sp. nov. 1 may be distinguished from other species of *Hypotelus* by the metatarsus dilated (Fig. 33).

Description

BL: 2.2–2.9 mm, BW: 0.6–0.8 mm. Body slightly cylindrical; dorsal surface glossy; brown, except elytra; appendices lighter, except mandibles. Dorsal integument of head and pronotum with disperse fine punctures and undulate microstriae (microstriae only on margins); elytra with disperse fine punctures and only one longitudinal striae finely punctate closely on elytral suture.

Male. **Head**. Antennae reaching humeral angle of elytra; antennomeres 5, 7, 9 and 11 with the long setae on internal face are longest; antennomeres 2 and 3 with same length, 5-11 gradually increasing in length toward antennal apex. Mandibles symmetrical and curved at apex. Mentum pentagon in form, 1.6 times wider than long and anterior angles conspicuously emarginated.

Thorax. Pronotum wider than long (PW/PL = 1.3); anterior angles rounded and slightly prominent; apical half with somewhat parallel sides and basal half gradually narrowing toward the base; complete internal mid-longitudinal ridge and slight longitudinal median sulcus only on basal half. Elytra somewhat longer than wide (EL/BW = 1.1), covering partially or not the abdominal segment 3. Metatarsomere 5 dilated (Fig. 33).

Abdomen. Abdominal tergites 4-6 on each half side with one pair of setae, external the longest; tergite 8 with posterior margin rounded and one pair of internal plates at lateral margin; sternite 8 with posterior margin rounded; tergite 9 with short ventral struts; sternite 9 with posterior margin truncate and with two pairs of long setae, the internal longest; tergite 10 with posterior and lateral margins weakly pigmented, with short fringes and four setae on each half side (Fig 49). Median lobe of aedeagus with bulbous base in ventral view and curved shape in lateral view (Fig. 62-63).

Female. Similar to male except for: without the longest setae on antennomeres 5, 7, 9 and 11; abdominal sternite 8 with posterior margin somewhat truncate and slightly emarginate, except in the middle region, with short setae (Fig. 73); tergite 9 without ventral struts; basal pouch as *H. pusillus*; ovipositor consisting of pair of weakly pigmented hemisternites and pair of more apical coxites, and with many long setae on apex; spermatheca as Fig. 88.

Geographical records

Panama (Chiriqui) (Fig. 94).

Biological Notes

This species was collected at an altitude above 5000 ft up to 6900 ft, under slab on pile of cut chips and bark, in split sapling, in scraping, in torn fibers of wounded tree and under bark of log on ground.

Remarks

Some specimens may have the metatarsomeres a little less dilated. The longest setae on internal face on antennomeres 5, 7, 9 and 11 sometimes not so evident.

Hypotelus sp. nov. 2

(Figs. 12, 24, 29, 41, 45, 48, 60, 61, 72, 84-86, 93)

Type material

Holotype deposited in FMNH, male (photo) [damaged specimen: without left flagellum], with labels: (1): "PERU: Cuzco Dept.,/Consuelo, Manu rd./Km 165, 10-X-1982," [white label, printed in black]; (2) "FMHD #82-363, ex/bamboo shoots, L. E./Watrous & G. Mazurek" [white label, printed in black].

Paratypes: 23 specimens, deposited in FMNH. 4 males with the same labels of holotype. 1 male with labels: (1) "PERU: Cuzco Dept.,/Consuelo, Manu rd./Km 165, 11-X-1982," [white label, printed in black]; (2) "FMHD #82-371, ex/bamboo shoots, L. E./Watrous & G. Mazurek" [white label, printed in black]. 7 females with the same labels of holotype. 7 females with labels: "PERU: Cuzco Dept.,/Consuelo, Manu rd./Km 165, 11-X-1982," [white label, printed in black]; (2) "FMHD #82-371, ex/bamboo shoots, L. E./Watrous & G. Mazurek" [white label, printed in black]; 2 females with labels: "PERU: Cuzco Dept.,/Consuelo, Manu rd./Km 165, 1-X-1982,/FMHD #82-313, ex" [white label, printed in black]; (2) "rotten palm & leaf/litter, L. E./Watrous & G. Mazurek" [white label, printed in black]; 1 female with labels: "PERU: Cuzco Dept.,/Consuelo, Manu rd./Km 165, 7-X-1982," [white label, printed in black]; (2) "FMHD #82-351, beat-ing felled palm, L./E. Watrous & G. Ma-/zurek" [white label, printed in black]; 1 female with labels: "PERU: Cuzco

Dept.,/Consuelo, Manu rd./Km 165, 12-X-1982," [white label, printed in black]; (2) "FMHD #82-374, ex/rotten palm, L. E./Watrous & G. Mazurek" [white label, printed in black].

Diagnosis

Hypotelus sp. nov. 2 is similar to *H. praecox* and differs by the body color, darker in *H.* sp. nov. 2 (Fig. 12), median lobe of aedeagus truncate at apex and with one prominent process at posterior margin (Fig. 60-61) and sternite 8 of female with posterior margin emarginate except in the middle region (Fig. 72).

Description

BL: 2.6–3.0 mm, BW: 0.7–0.8 mm. Body slightly cylindrical; dorsal surface glossy; reddish dark brown, appendices lighter (Fig. 12). Dorsal integument of head and pronotum with disperse fine punctures and undulate microstriae; elytra with disperse fine punctures and only one longitudinal striae finely punctate closely on elytral suture.

Male. **Head**. Front with two slightly pointed frontal processes (Fig. 17); Antennae almost reaching apex of elytra; scape with prominent tooth on internal face; antennomere 3 longer than 2; 5-11 longer than wide, with same length. Labrum with median third deeply emarginate, six longs setae medially and one pair of each external angle (Fig. 24). Mandibles symmetrical and curved at apex. Labium with ligula slightly emarginate on the middle with pointed lobe on each anterior angle and two pairs of conspicuous long setae on anterior margin (Fig. 29). Mentum pentagon in form, 1.6 times wider than long and anterior angles conspicuously emarginated.

Thorax. Pronotum wider than long (PW/PL = 1.3); anterior angles rounded and slightly prominent; apical half with somewhat parallel sides and basal half gradually narrowing toward the base; complete internal mid-longitudinal ridge and slight longitudinal median sulcus only on disc. Elytra somewhat longer than wide (EL/BW = 1.1), covering partially or totally the abdominal segment 3.

Abdomen. Abdominal tergites 4-6 on each half side with one pair of setae, external the longest; tergite 8 with posterior margin rounded and a pair of internal plates at lateral margin; sternite 8 with posterior margin narrower and rounded, with short setae except in the middle region (Fig. 45); tergite 9 with short ventral struts; sternite 9 with posterior margin truncate and with two pairs of long setae, the internal longest; tergite 10 at apex with four setae on each half side and short fringes (Fig. 48). Median lobe of aedeagus with bulbous base

in ventral view and curved shape in lateral view; truncate at apex and with one prominent process on median region at posterior margin (Fig. 60-61).

Female. Similar to male except for: bigger distance between pointed frontal processes (Fig. 18); antennae shorter, with antennomeres 5-10 shorter in length; scape without prominent tooth on internal margin; abdominal sternite 8 with posterior margin emarginate except in the middle region and with short setae (Fig. 72); tergite 9 without ventral struts; tergite 10 weakly pigmented at apex (Fig. 85); basal pouch forming a narrow duct at basal half and apical half bulbous (Fig. 84); ovipositor consisting of pair of weakly pigmented hemisternites and pair of more apical coxites, and with many long setae on apex; spermatheca with globose capsule (Fig. 86).

Geographical records

Peru (Cusco) (Fig. 93).

Biological Notes

This species was collected in bamboo shoots.

Hypotelus sp. nov. 3

(Figs. 14, 40, 64, 65, 74, 89-91, 93)

Type material

Holotype deposited in DZUP, male (photo) [damaged specimen: without right anterior leg, tibia and tarsus of right middle leg and tarsus of right hind leg. Dissected, body glued on white board; abdominal segments 8 to 10 and aedeagus fixed on plastic board and covered with Canada balsam], with labels: (1) “Peru/Lamas” [old white label, printed in black]; (2) “Coleção/M. Alvarenga” [old white label, printed in black]; (3) “♂” [old white label, printed in black]; (4) “COTYPUS/Hypotelus/Weyranchi/O. Scheerpeltz” [pink label, first and last lines printed in black, except the letter O; other lines, handwritten].

Paratype: 1 female, deposited in DZUP [dissected, abdominal segments 8 to 10 and spermatheca fixed on plastic board and covered with Canada balsam], with the same labels of holotype, except: (3) “♀” [old white label, printed in black].

Diagnosis

Hypotelus sp. nov. 3 may be distinguished from other species of *Hypotelus* by the color pattern of pronotum (Fig. 15).

Description

BL: 3.0–3.3 mm, BW: 0.8 mm. Body slightly cylindrical; dorsal surface glossy; dark brown, except elytra yellowish (with two transversal darker area, basal and apical) (Fig. 14); appendices lighter, except mandibles and antennomeres 4-11. Dorsal integument of head and pronotum with disperse fine punctures and undulate microstriae (microstriae absents on basal disc of head and on disc of pronotum); elytra with disperse fine punctures and only one longitudinal striae finely punctate closely on elytral suture.

Male. **Head**. Antennae inserted ventrally and passing humeral angle of elytra, antennomere 2 and 3 with same length; 5-11 gradually increasing in length toward antennal apex. Mandibles curved at apex.

Thorax. Pronotum wider than long (PW/PL = 1.5); anterior angles rounded and slightly prominent; apical half with somewhat parallel sides and basal half gradually narrowing toward the base; complete internal mid-longitudinal ridge and slight longitudinal median sulcus only on basal two-third. Elytra somewhat longer than wide (EL/BW = 1.2), covering partially or not the abdominal segment 3.

Abdomen. Abdominal tergites 4-6 on each half side with one pair of long setae with the almost length; tergite 8 with posterior margin truncate and a pair of internal plates at lateral margin (Fig. 40); sternite 8 at posterior margin with a small strip weakly pigmented and short setae; tergite 9 with short ventral struts; sternite 9 with posterior margin truncate and with two pairs of long setae, the internal longest; tergite 10 with posterior margin weakly pigmented, short fringes and four setae on each half side. Median lobe of aedeagus with slightly bulbous base in ventral view and curved shape in lateral view; apex in lateral view, curved in the opposite direction of the shape of aedeagus, forming a hook (Figs. 64-65).

Female. Similar to male except for: abdominal sternite 8 with posterior margin sinuous (Fig. 74); tergite 10 truncate at apex (Fig. 90); bursa's plate forming like a narrow ring; ovipositor consisting of pair of weakly pigmented hemisternites and pair of more apical coxites, and with many long setae on apex; spermatheca as Fig. 91.

Geographical records

Peru (San Martín) (Fig. 93).

Biological Notes

No data.

FINAL CONSIDERATIONS

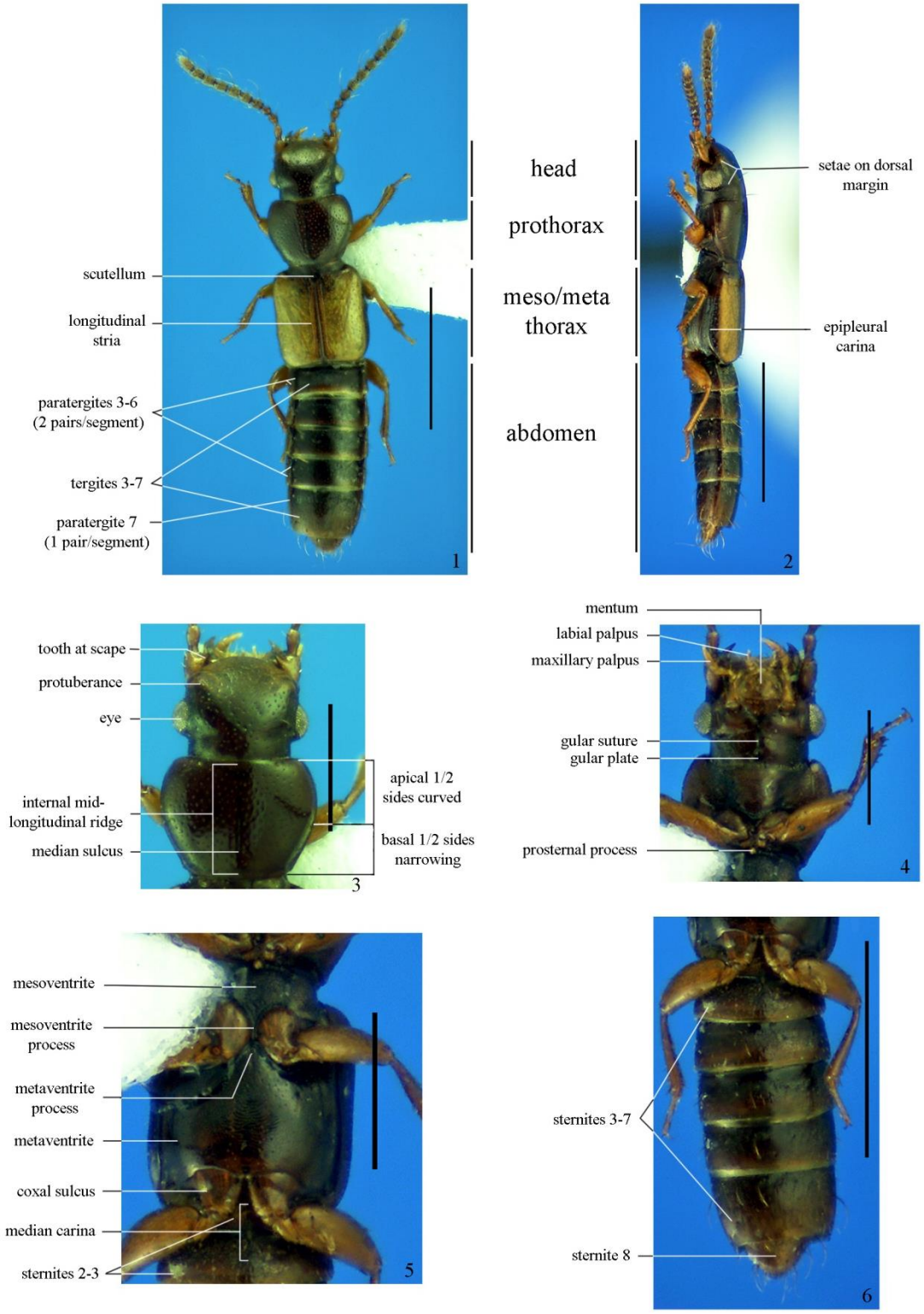
Through this work, the information about *Hypotelus* are gathered, which partly facilitates the study of Piestinae, a Staphylinidae group historically problematic both in morphological as in evolutionary questions.

All species of *Hypotelus* have their terminalia described and illustrated for the first time, except for two recently redescribed species, reviewed here. An identification key is available for the known *Hypotelus* species of the world.

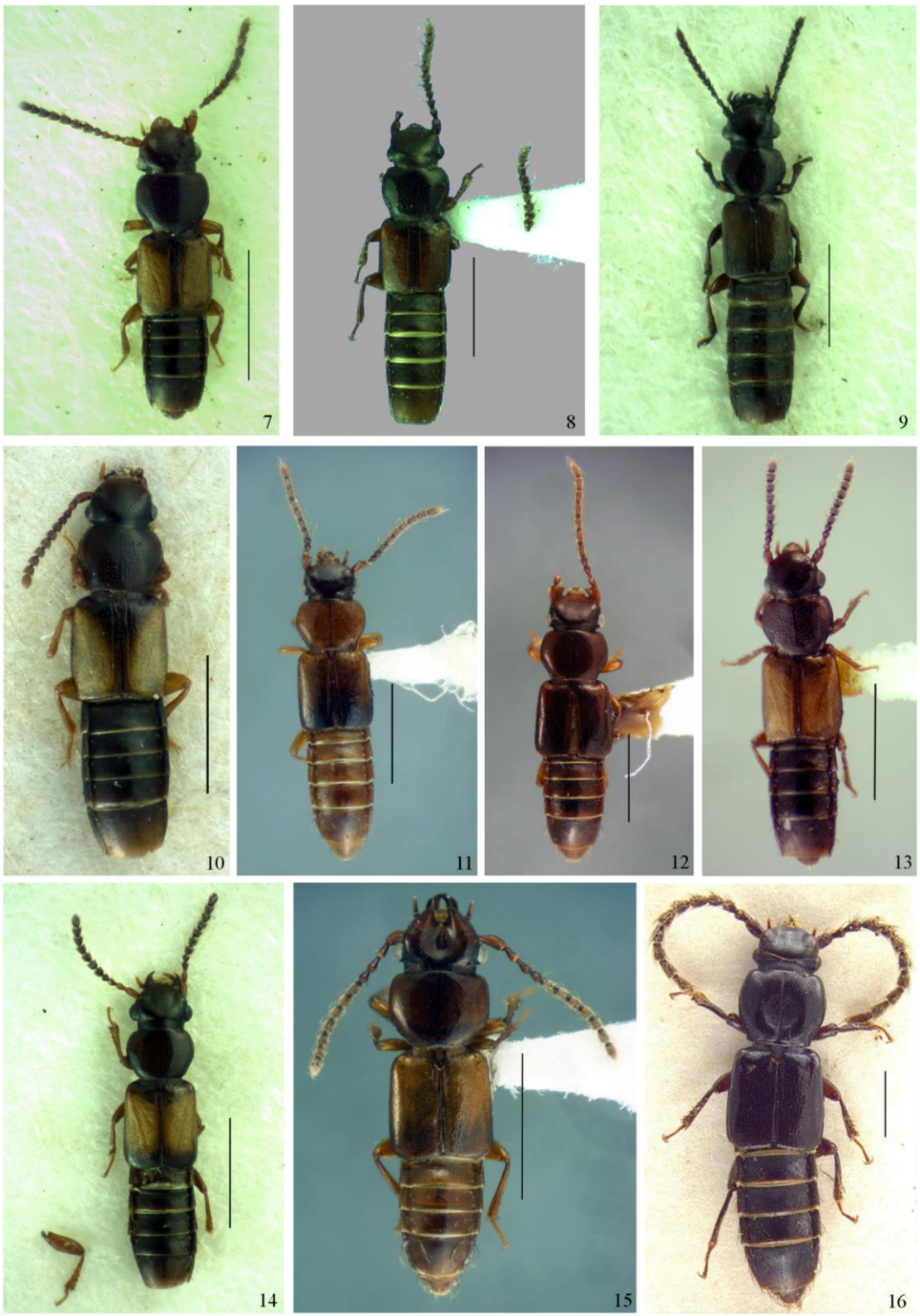
The geographical records and natural history data for each species are updated, thus the genus is considered Neotropical with five new records: Costa Rica, Grenada, Trinidad and Tobago, French Guiana and Paraguay. An unique record is known for the Nearctic region (*H. pusillus*), presumably by a posterior dispersion.

Hypotelus has 11 described species, three new, and all of them share a character already known in the literature: elytral disc without impressed striae (except along suture), with evenly distributed punctures. In addition to this, we added the following characters: antennomeres 5-11 entirely with microsetae and some long dispersed setae, labium with two pairs of conspicuous long setae on anterior margin near of median sclerotinized plate of ligula, mentum with anterior angles conspicuously emarginated, abdominal segments 3-6 with two pairs of paratergites and abdominal segment 7 visibly the longest one. Therefore, we confirm the inclusion of *H. andinus* and *H. laevis* in *Hypotelus* by Caron *et al.* (2012).

Through this paper, we give the necessary basis about *Hypotelus* for further phylogenetic works on the poorly known “Piestinae”.

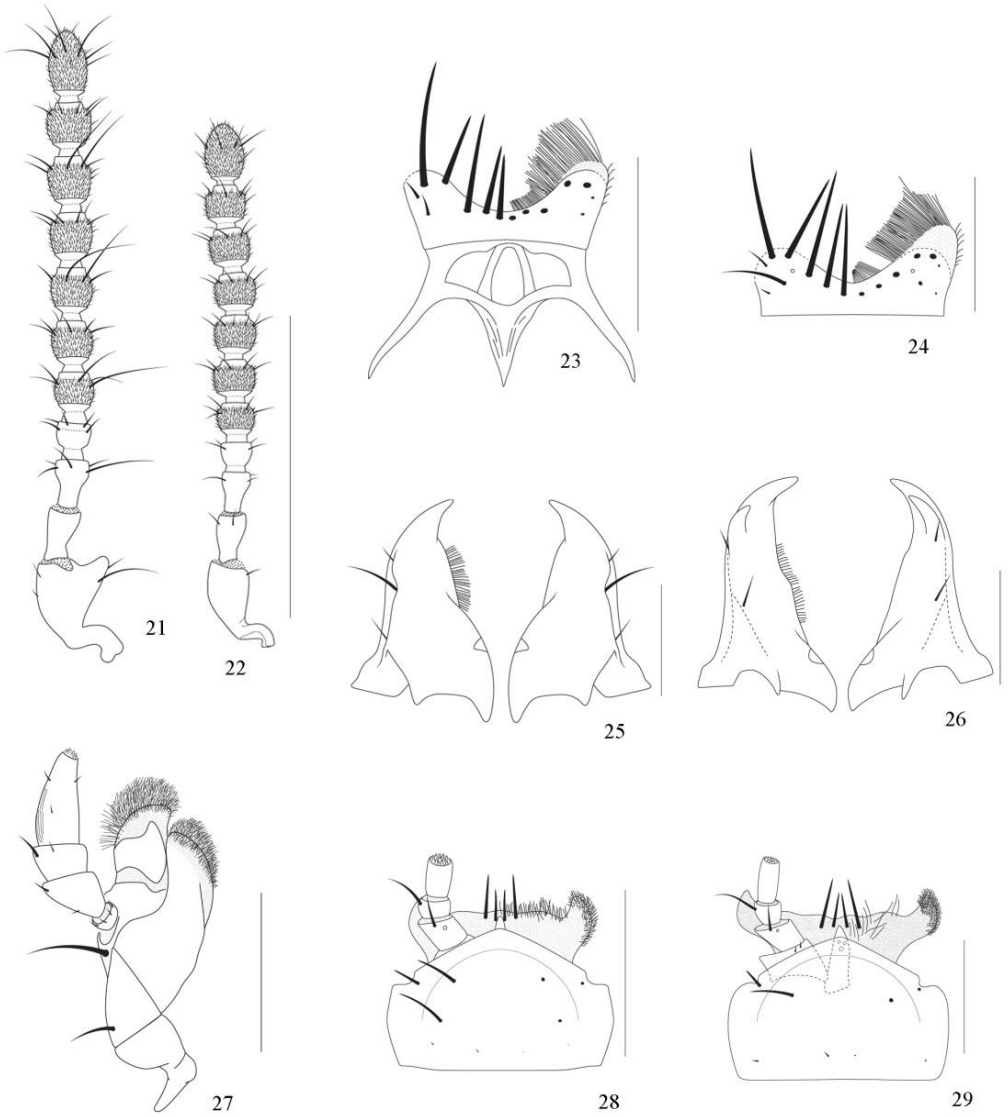


Figures 1-6. *Hypotelus pusillus*, male. 1, habitus, dorsal view; 2, habitus, lateral view; 3, head and pronotum, dorsal view; 4, head and pronotum, ventral view; 5, meso and metaventrite, ventral view; 6, abdomen, ventral view; Scale bars Figs. 1-2, 6 = 1 mm; Figs.3-5 = 0.5 mm.

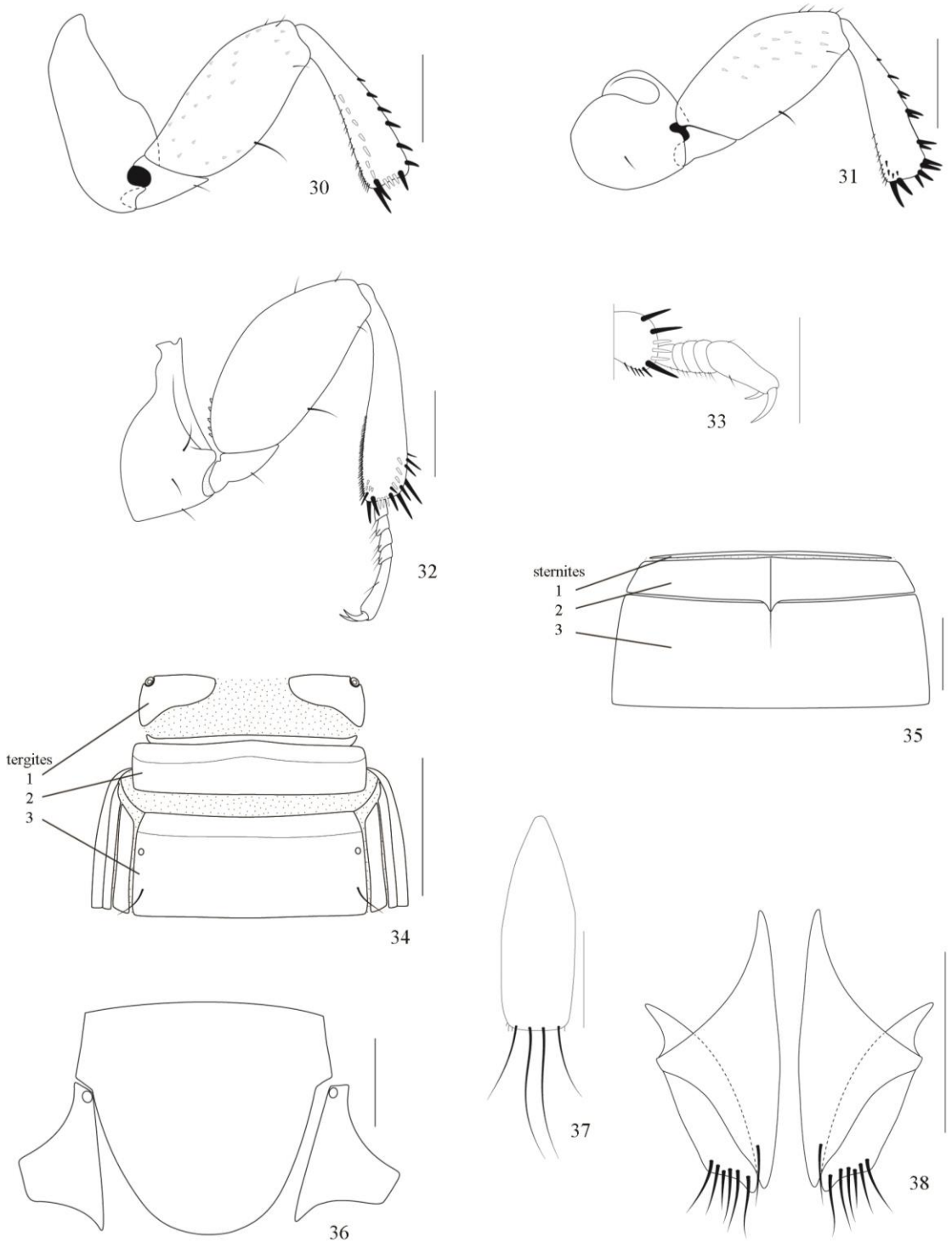


Figures 7-16. Habitus, dorsal view. 7, *Hypotelus insulanus*, syntype, male; 8, *H. marginatus*, male; 9, *H. testaceus*, syntype, male; 10, *H. micans*, female; 11, *H. praecox*, male; 12, *H.* sp. nov. 2, holotype, male; 13, *H.* sp. nov. 1, holotype, male; 14, *H.* sp. nov. 3, holotype, male; 15, *H. laevis*, male; 16, *H. andinus*, image from Caron *et al.* (2012). Scale bars = 1 mm.

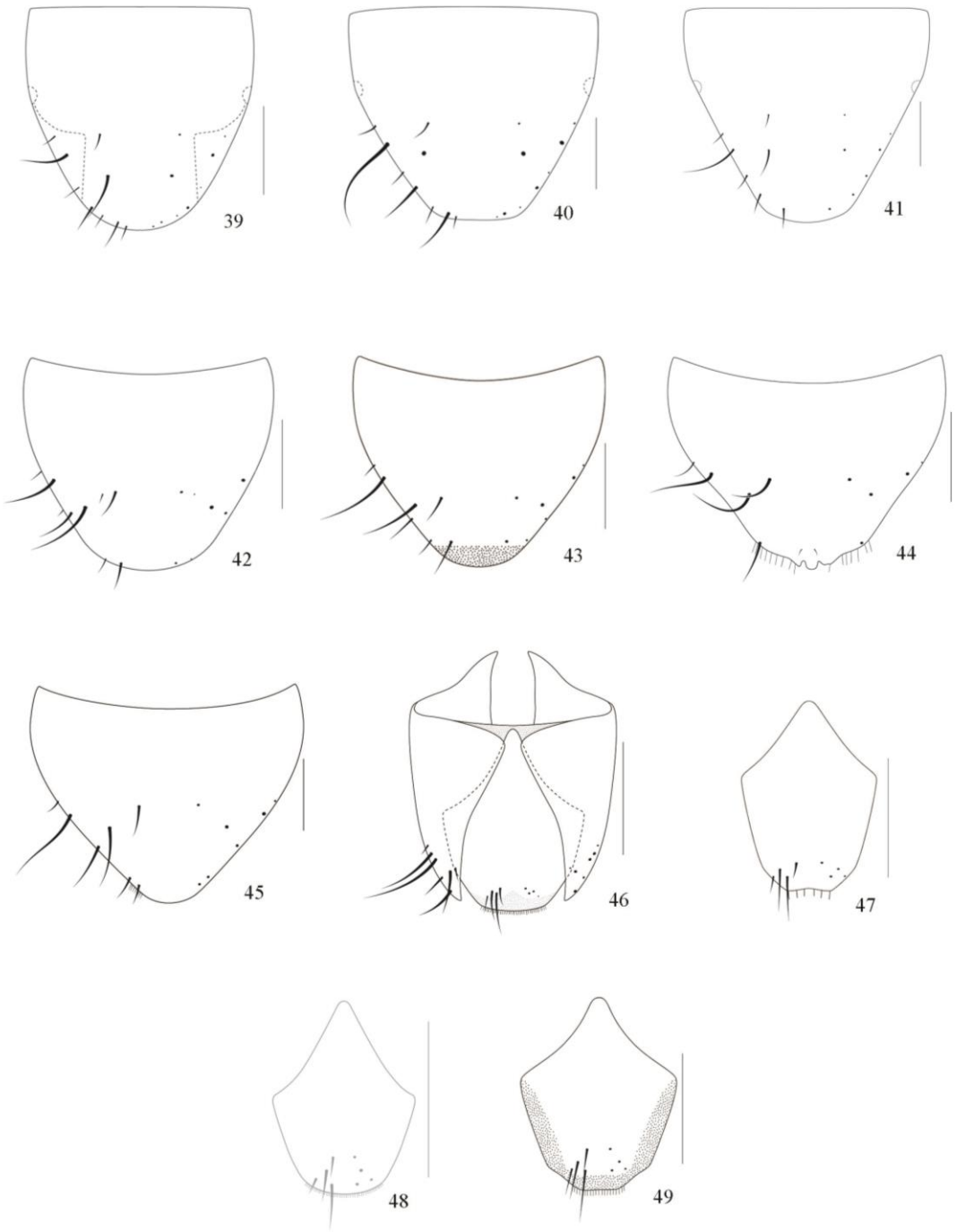
Figures 17-20. Head and pronotum, dorsal view. 17, *Hypotelus* sp. nov. 2, male; 18, *H*. sp. nov. 2, female; 19, *H. laevis*, male; 20, *H. laevis*, female. Scale bars = 0.5 mm.



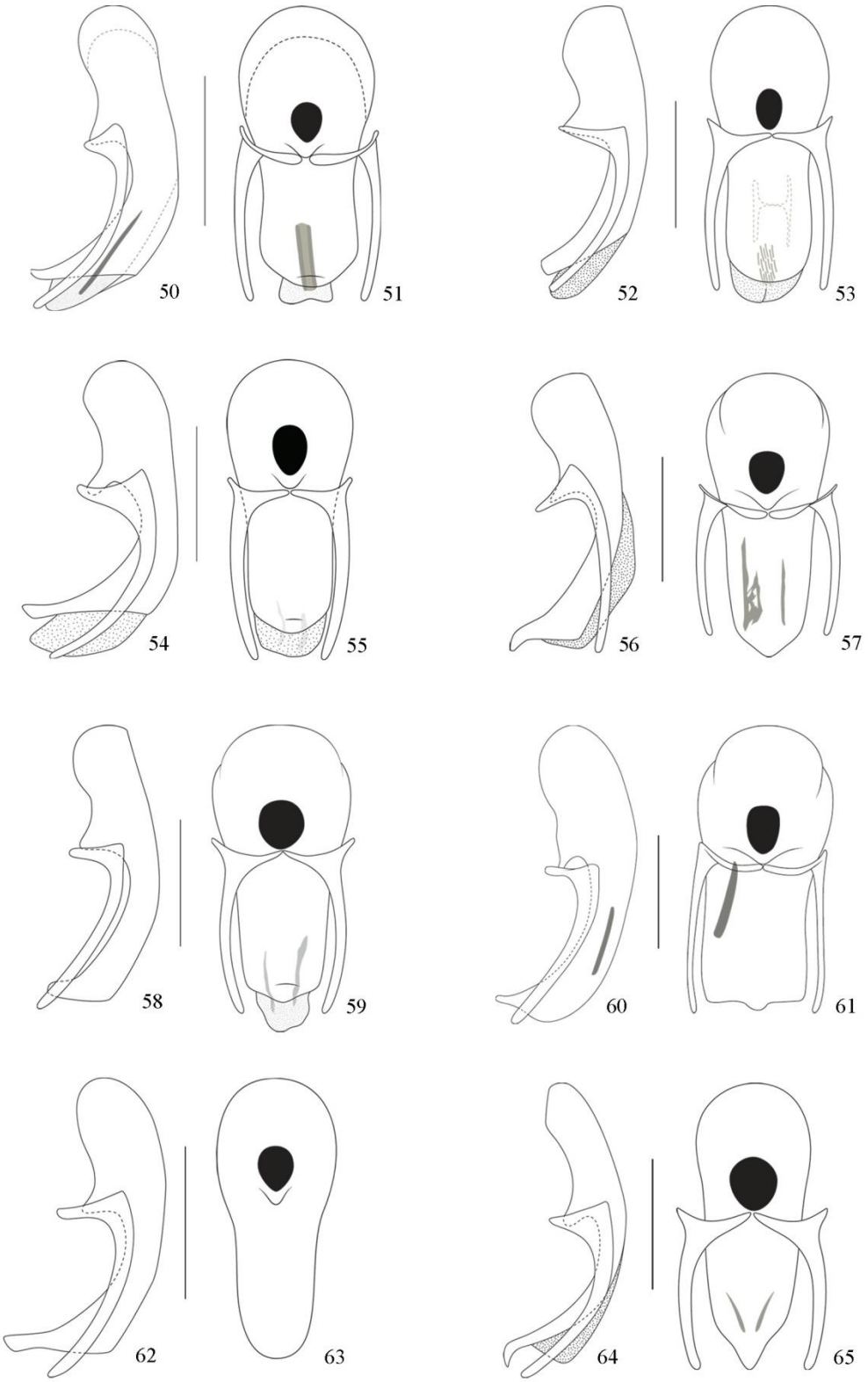
Figures 21-29. 21-23, *Hypotelus pusillus*. 21, antenna, male; 22, antenna, female; 23, labrum, left epipharynx and right setae removed; 24, *H*. sp. nov. 2, labrum, left epipharynx and right setae removed; 25, *H. pusillus*, mandibles, right prostheca removed; 26, *H. laevis*, mandibles, right prostheca removed; 27-28, *H. pusillus*. 27, maxilla; 28, labium, left setae of the ligula and right setae of the mentum removed; 29, *H*. sp. nov. 2, labium, left setae of the ligula and right setae of the mentum removed. Scale bars Figs. 21, 22 = 0.5 mm; Figs. 23-29 = 0.125 mm.



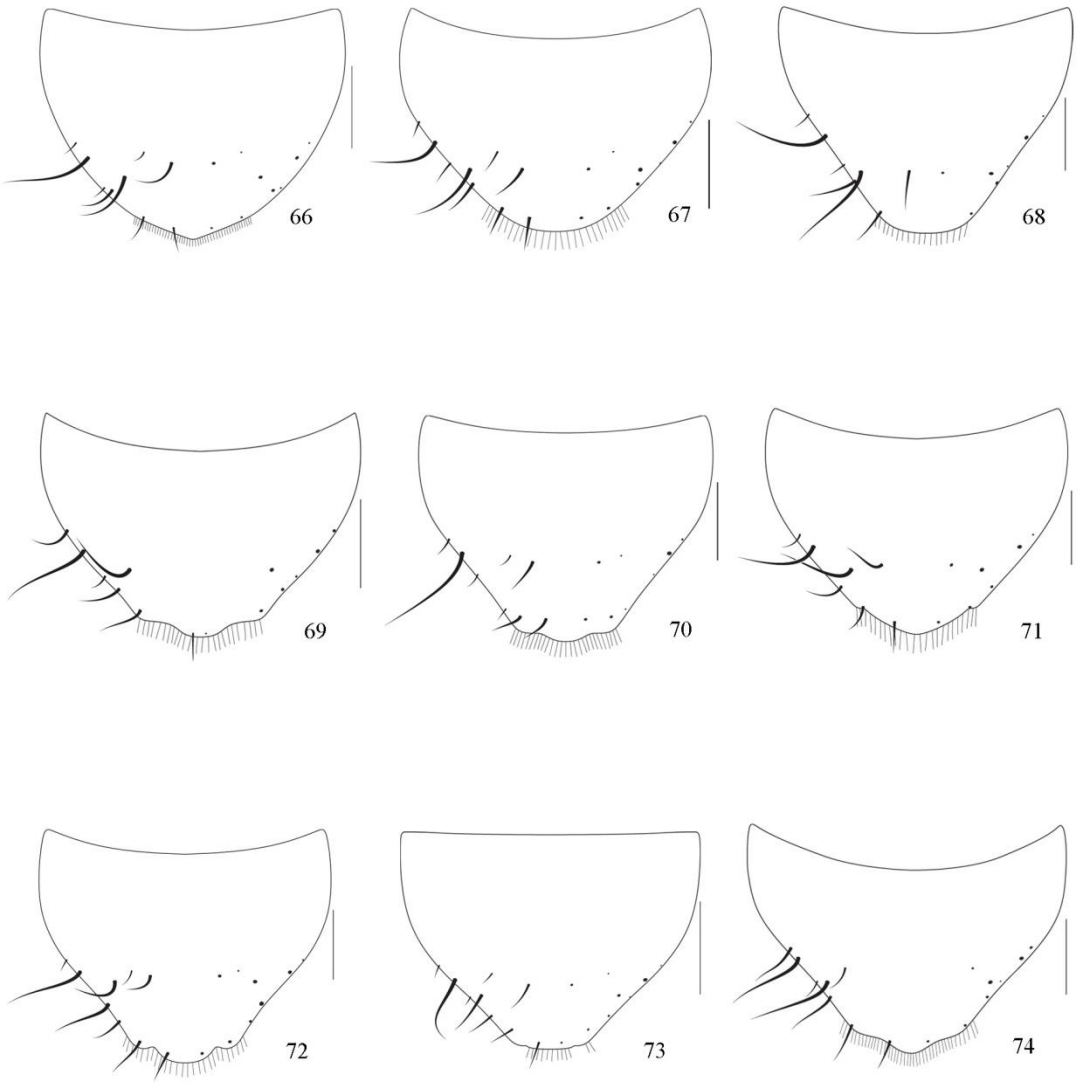
Figures 30-38. 30-32, *Hypotelus pusillus*. 30, anterior leg, posterior view; 31, median leg, posterior view; 32, hind leg, posterior view; 33, *H.* sp. nov. 1, metatarsus, lateral view. 34-38, *H. pusillus*. 34, tergites 1-3, dorsal view; 35, sternites 1-3, ventral view; 36, tergite 8, female, dorsal view, setae removed; 37, sternite 9, male, ventral view; 38, ovipositor, female, ventral view. Scale bars = 0.125 mm.



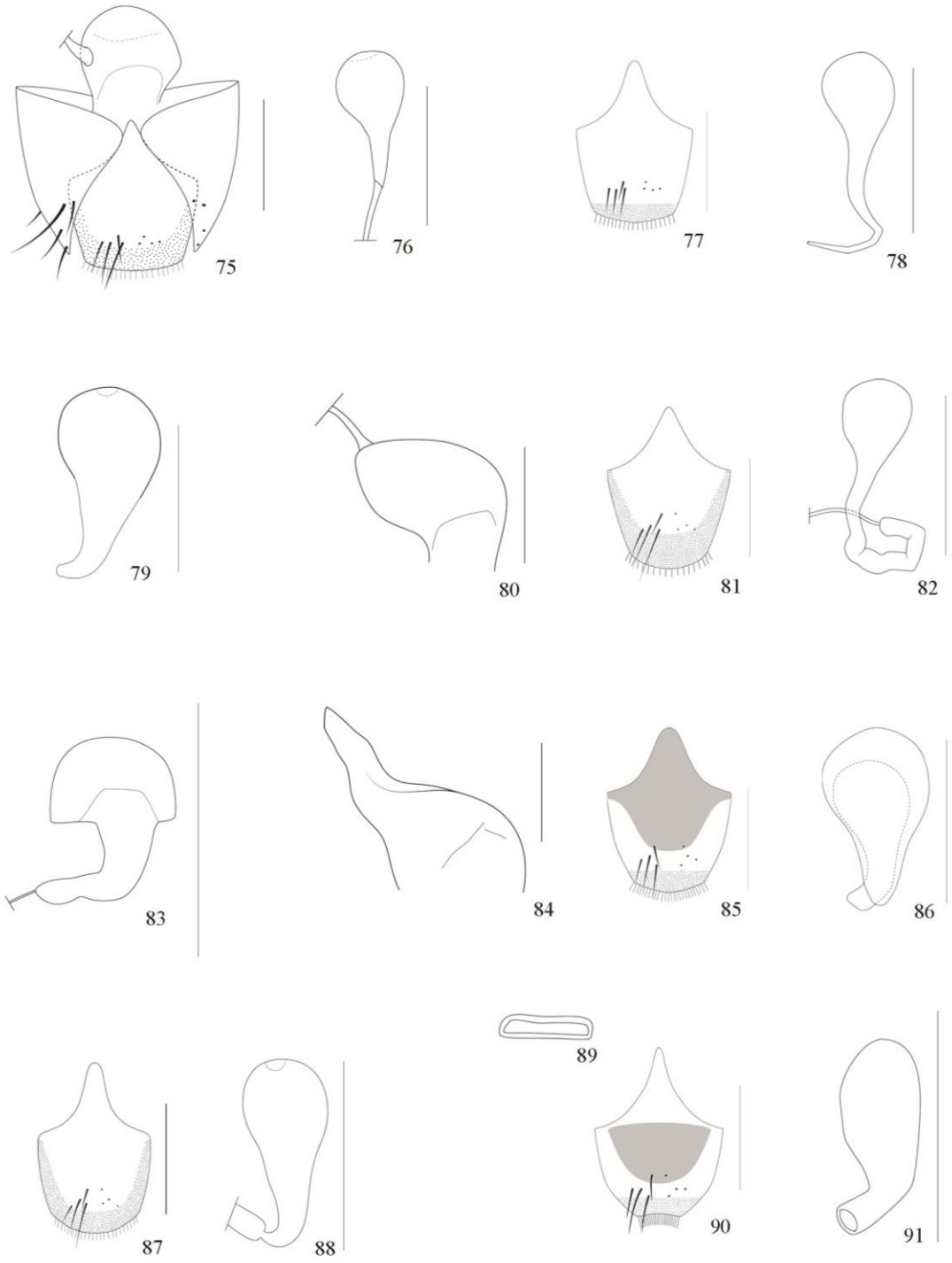
Figures 39-49. Tergites and sternites of males in dorsal and ventral view, respectively and right setae removed. 39, *Hypotelus pusillus*, tergite 8; 40, *H*. sp. nov. 3, tergite 8; 41, *H*. sp. nov. 2, tergite 8; 42, *H. pusillus*, sternite 8; 43, *H. insulanus*, sternite 8; 44, *H. testaceus*, sternite 8; 45, *H*. sp. nov. 2, sternite 8; 46, *H. pusillus*, tergites 9 and 10; 47, *H. insulanus*, tergite 10; 48, *H*. sp. nov. 2, tergite 10; 49, *H*. sp. nov. 1, tergite 10. Scale bars = 0.125 mm.



Figures 50-65. Aedeagus, for each species with lateral view and ventral view, respectively. 50-51, *Hypotelus pusillus*; 52-53, *H. insulanus*; 54-55, *H. marginatus*; 56-57, *H. testaceus*; 58-59, *H. praecox*; 60-61, *H*. sp. nov. 2; 62-63, *H*. sp. nov. 1, lateral lobes removed in ventral view; 64-65, *H*. sp. nov. 3. Scale bars = 0.125 mm.



Figures 66-74. Sternites 8 of females in ventral view, right setae removed. 66, *Hypotelus pusillus*; 67, *H. insulanus*; 68, *H. marginatus*; 69, *H. testaceus*; 70, *H. micans*; 71, *H. praecox*; 72, *H*. sp. nov. 2; 73, *H*. sp. nov. 1; 74, *H*. sp. nov. 3. Scale bars = 0.125 mm.



Figures 75-91. Tergites in dorsal view and genitalia of female. 75-76, *Hypotelus pusillus*. 75, tergite 9, 10 and basal pouch, right setae removed; 76, spermatheca; 77-78, *H. insulanus*. 77, tergite 10, right setae removed; 78, spermatheca; 79, *H. marginatus*, spermatheca; 80-82, *H. testaceus*. 80, basal pouch; 81, tergite 10, right setae removed; 82, spermatheca; 83, *H. micans*, spermatheca; 84-86, *H*. sp. nov. 2. 84, basal pouch; 85, tergite 10, right setae removed; 86, spermatheca; 87-88, *H*. sp. nov. 1. 87, tergite 10, right setae removed; 88, spermatheca. 89-91, *H*. sp. nov. 3. 89, basal pouch; 90, tergite 10, right setae removed; 91, spermatheca. Scale bars = 0.125 mm.

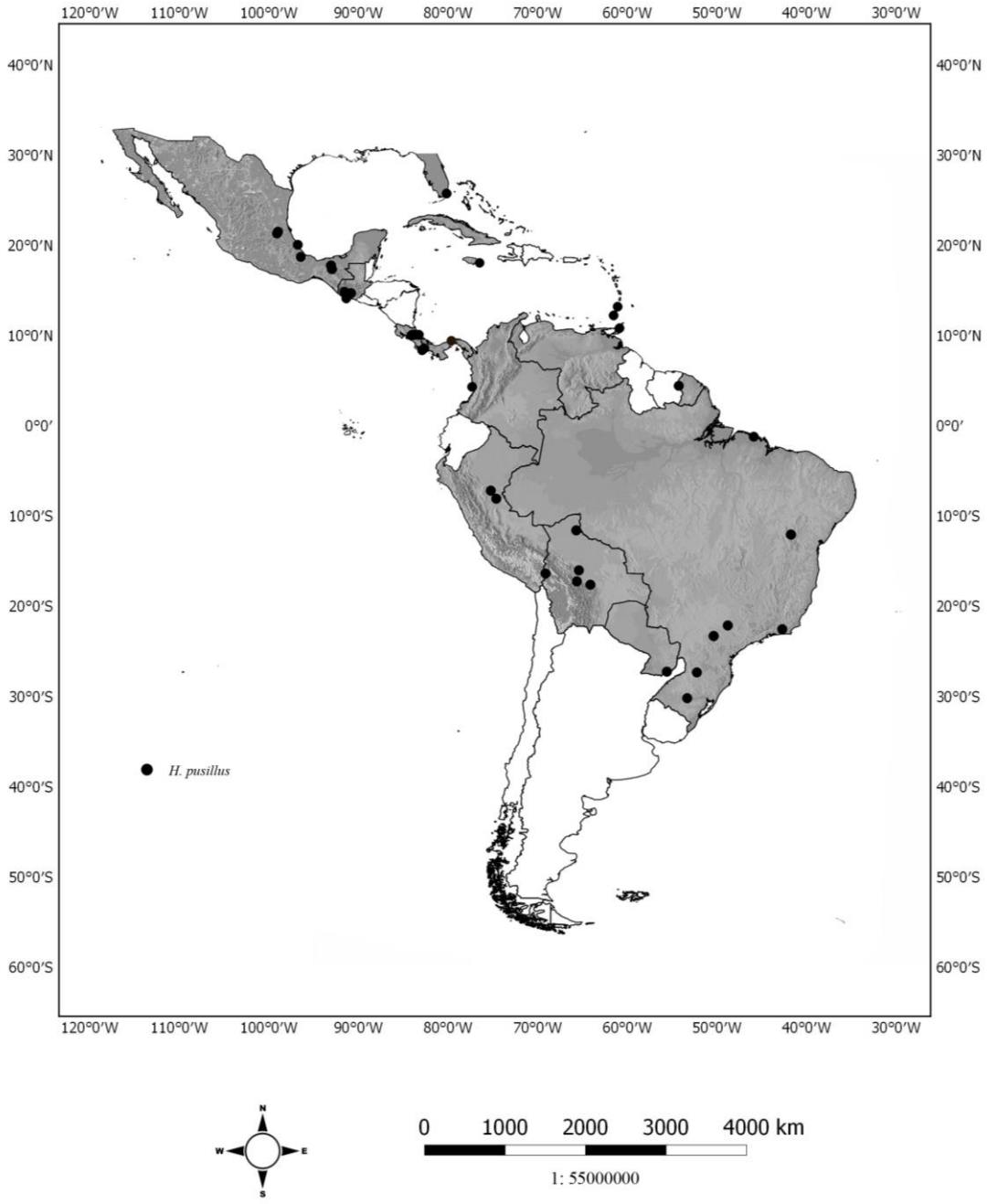


Figure 92. Geographical records of *Hypotelus*. Countries without dots but colored represent the occurrence but no locality given. *Hypotelus pusillus*, United States of America, Mexico, Cuba, Jamaica, Guatemala, Costa Rica, Panama, Saint Vincent and the Grenadines, Grenada, Trinidad and Tobago, Colombia, Venezuela, French Guiana, Peru, Bolivia, Brazil and Paraguay.

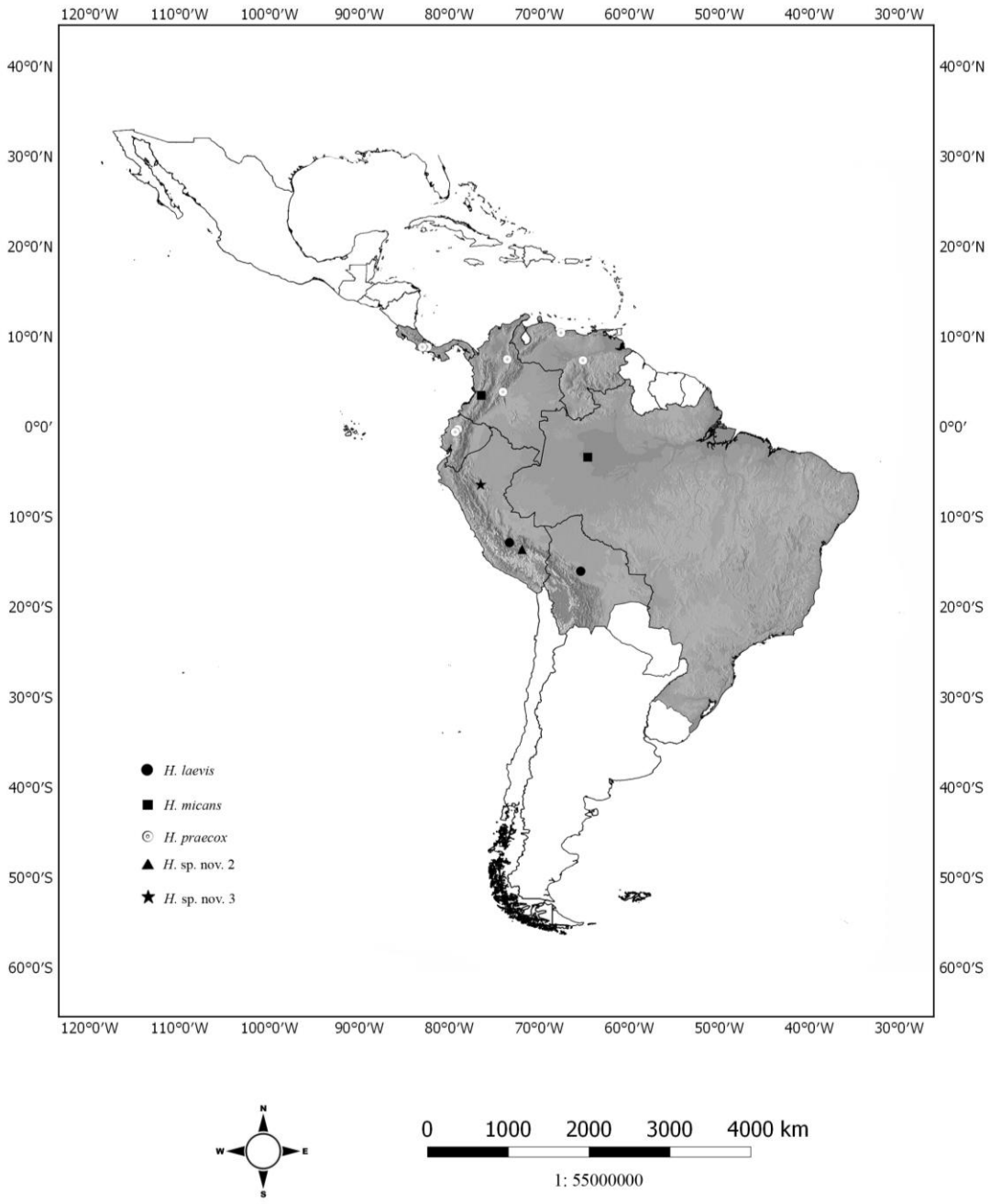


Figure 93. Geographical records of *Hypotelus*. Countries without dots but colored represent the occurrence but no locality given. *Hypotelus laevis*, Bolivia and Peru; *H. micans*, Colombia and Brazil; *H. praecox*, Costa Rica, Panama, Colombia, Venezuela and Ecuador; *H*. sp. nov. 2, Peru; H, *H*. sp. nov. 3, Peru.

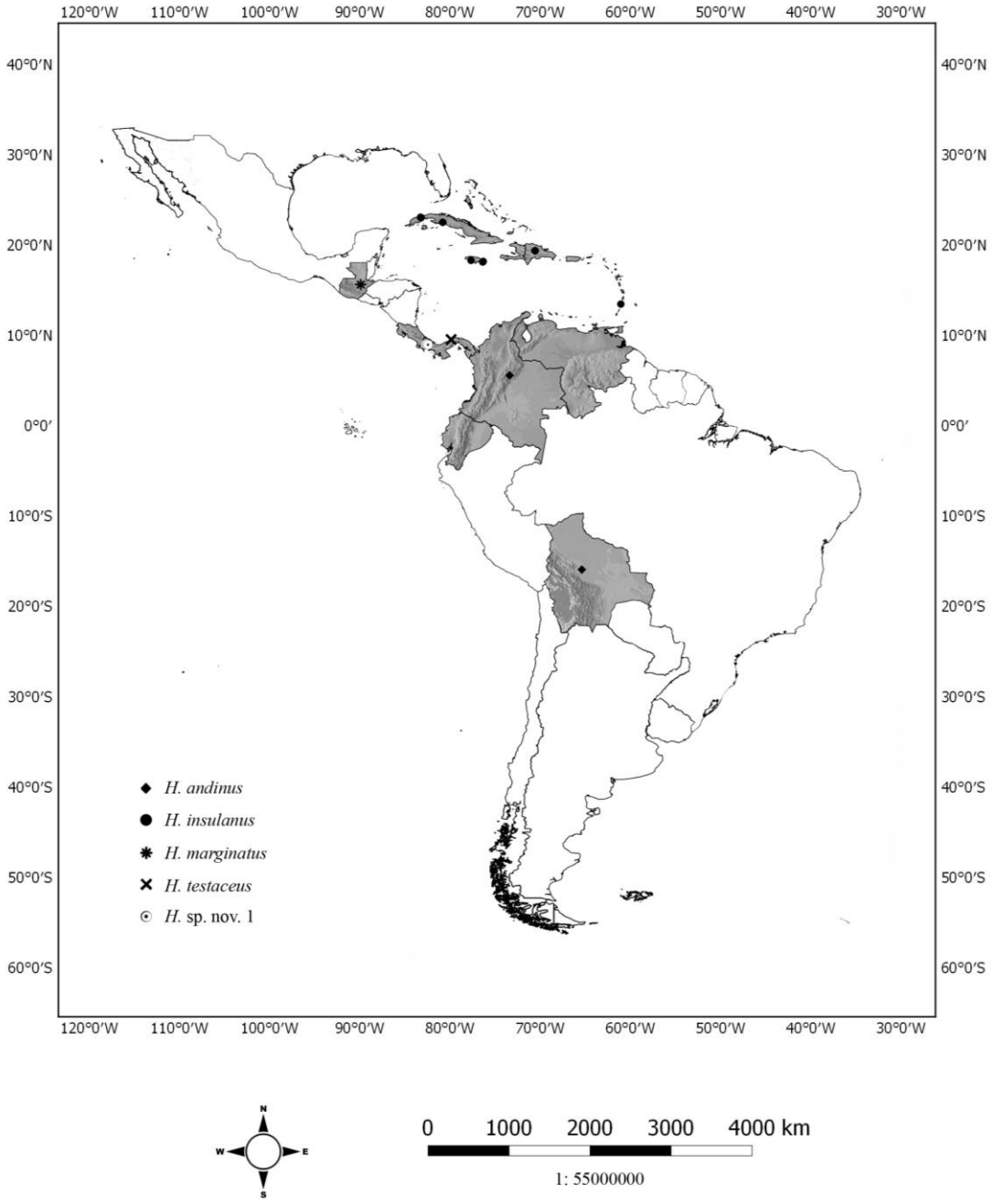


Figure 94. Geographical records of *Hypotelus*. Countries without dots but colored represent the occurrence but no locality given. *Hypotelus andinus* Colombia, Ecuador and Bolivia; *H. insulanus* Caribbean islands; *H. marginatus* Colombia, Venezuela and Guatemala ; *H. testaceus* Panama ; *H*. sp. nov. 1, Panama;

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